

Fast-response remote control  
of catalyst level  
boosts process efficiency ... Page 30

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APRIL 1958



# CHEMICAL PROCESSING

\$1.00 the copy



## Telling Our Industry's Story ...a steady job

Food Machinery's ERNEST HART,  
1958 MCA board chairman,

stresses need for year-round 'selling' of  
chemical industry at community level  
page 33



# Yes, the Halogen Fluorides are commercially available from B&A®!

With the exception of elemental fluorine, the Halogen Fluorides are the most reactive chemicals known. They react with the vast majority of inorganic and organic compounds and with many metals. These unique characteristics suggest many interesting paths of research for the alert investigator to follow—particularly where vigorous incendiary or fluorinating agents are indicated.

General Chemical's commercial production of the Halogen Fluorides marks another step in the company's extensive program with elemental fluorine and compounds derived from it.

## CHLORINE TRIFLUORIDE

is commercially available in the ton cylinders shown at right . . . also in cylinders of 150 pounds net.

**Bromine trifluoride**  
**Bromine pentafluoride**  
**Iodine pentafluoride**  
are offered in various-sized cylinders to suit demand.

With tonnage quantities of the Halogen Fluorides readily available, industrial development of many experimental applications is now possible and new research in many fields can go forward. They may provide the answer to your needs. Write today (on business letterhead, please) for Technical Bulletin TA-8532-2, covering Chlorine Trifluoride and other Halogen Fluorides.



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Check 4369 opposite last page



that's interesting

## Direct conversion

Long-range hope of directly utilizing solar energy lies in photochemistry, based on photo-electric actions. Using photo-electric techniques, Dr. Oster of the Polytechnic Institute of Brooklyn, found that acridine dyes can be reduced by alkali metal hydride and light, and that in the dark the reaction would reverse itself. This ready photo-reduction gives the dyes excellent characteristics for use as possible solar energy converters. Nearly 25% of the light absorbed by the dye converts into chemical products which, if utilized as one chamber of an electrical cell, would produce electricity.

## Atomeals

While the army still travels on its stomach, the atomic troops of the future must move more quickly, with less equipment. Storage and transportation needs must be cut. In spite of this the army hopes to feed the troops two hot meals of varied, tasty, and wholesome



food each day. How? Why with the science of dehydration and irradiation. A typical experimental "atomeal" dinner menu for 25 men would be contained in a corrugated cardboard box that weighs 34 lb. It would include: lima bean soup, sweet potatoes, green beans, orange juice, apples, cheese, chicken, rolls, shortening, margarine, crackers, sugar, flour, cinnamon, coffee, cream, and salt. Some are entirely dehydrated while



... Thought-provoking slants  
on projects and products

others rely heavily on irradiation. All that would be needed to prepare this bountiful feast would be hot water. (D&O News, Dodge & Olcott, Inc.)

**The mother of invention**

Development and testing of rockets, missiles, and supersonic aircraft have resulted in some unique testing and control equipment. A new automatic missile tracker can locate and photograph a supersonic object the size of a "Coke" bottle from a distance of four miles. An air condition-



"No! We will not track your ball  
JUST IN CASE you slice into the  
rough"

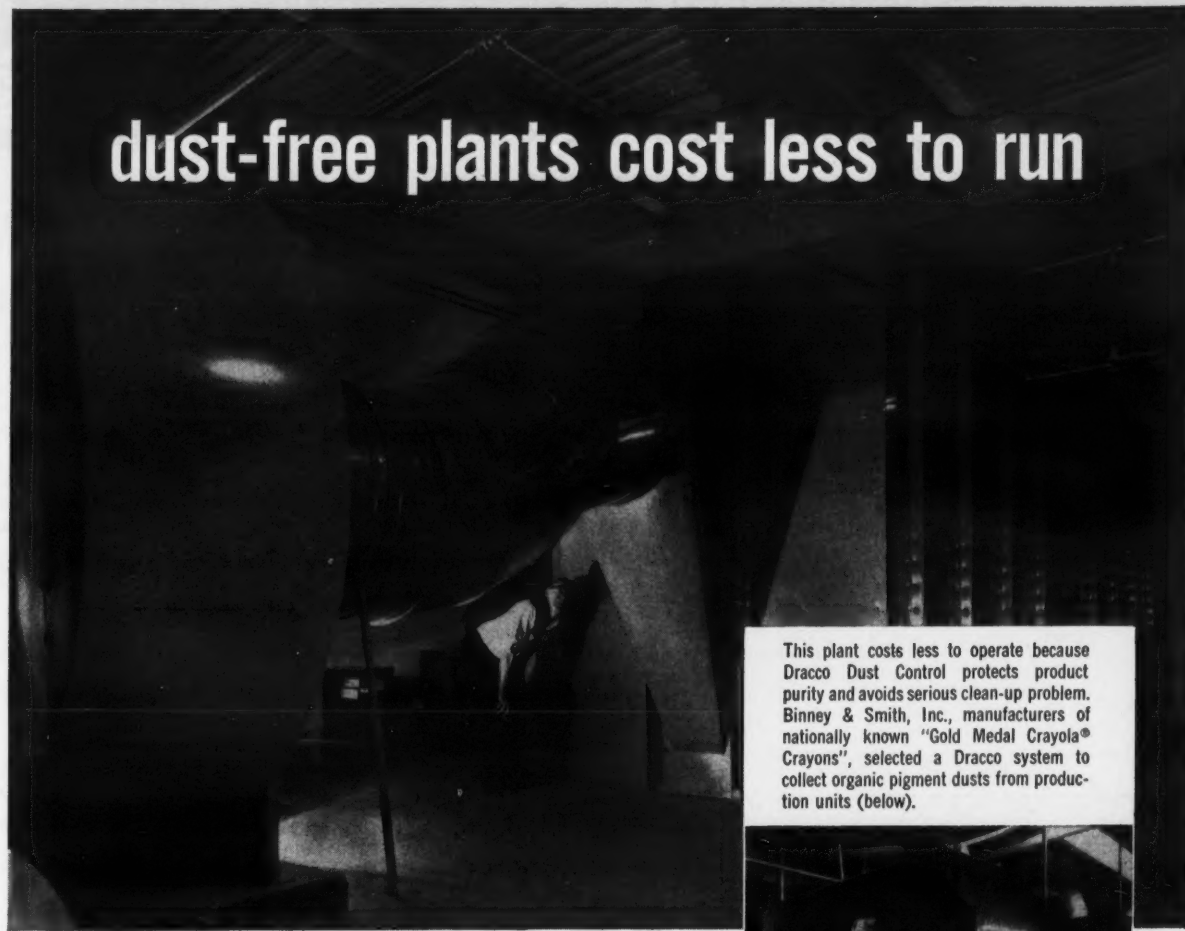
ing system for a new US supersonic bomber can lower temperatures 1000° F in less than one second. The rocket sled used in USAF research tests, has a stopping action equivalent to stopping an auto speeding 100 mph in less than 2½ ft.

**Magneto-aerodynamics**

A new science could help us recover rockets or satellites. Magneto-aerodynamics, concerned with partial ionization of air when high-speed objects pass through it, could be used to reduce the heat generated by a satellite re-entering the atmosphere. It would work like this: Hot air (seeded with easily ionizable substance such as sodium) being a conductor of electricity acts as winding of a generator armature. A permanent magnetic field emanating from

To page 5

# dust-free plants cost less to run



This plant costs less to operate because Dracco Dust Control protects product purity and avoids serious clean-up problem. Binney & Smith, Inc., manufacturers of nationally known "Gold Medal Crayola® Crayons", selected a Dracco system to collect organic pigment dusts from production units (below).



Uncontrolled dust in your plant can impair employee health or working efficiency, shorten machine life, contaminate critical materials, cause excessive plant clean-up and maintenance costs and disrupt community relations.

You can trap dust at its source, and eliminate its nuisance, irritating, toxic or abrasive effects—with Dracco Dust Control Equipment. Men and machines work better in clean, pleasant surroundings. Absence of dirt and corrosion keeps maintenance costs lower.

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- Improve community relations by halting air pollution

Complete 40-page catalog on Dracco Dust Control Equipment contains detailed data and valuable reference material. Write for Bulletin 800.

**DRACCO** airstream conveyors  
dust control equipment

Check 4370 opposite last page

## PACKAGED AIR HEATERS by THERMAL

Extreme compactness, high efficiency and versatility of operation are the chief characteristics of the THERMAL Type CA direct fired air heater. Designed around the high velocity THERMAL burner, it normally requires no refractory, since combustion is limited almost entirely to the burner itself. Adding to its versatility, the CA air heater performs equally well on gas, oil or combination firing and can be adapted to all pressure levels.

Type



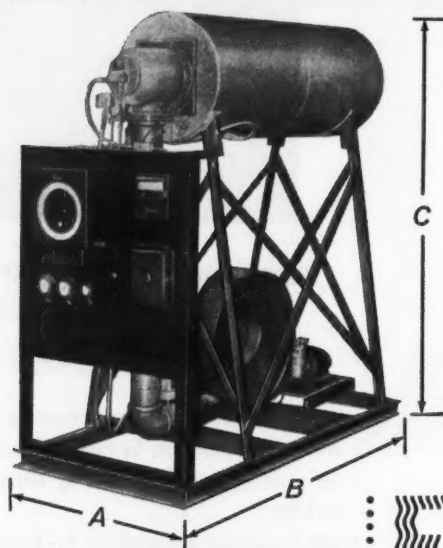
direct  
fired

Type CA air heaters are most frequently sold as "packaged" units complete with all necessary safety and control apparatus. These units will provide outputs ranging from 200,000 BTU/hr to better than 30,000,000 BTU/hr and at temperatures from 300F to 1500F or higher.

### TYPICAL SIZES . . .

Listed below are the overall dimensions of a few of the dozens of output, temperature, and flow combinations possible in these heaters. Figures are for atmospheric pressure units. Higher pressure heaters would be smaller.

BTU/hr	AIR FLOW scfm	TEMP. IN °F	TEMP. OUT °F	A ft.	B ft.	C ft.
800,000	1,000	60	750 F	2½	4½	4
2,500,000	5,000	60	500 F	4	7	6
4,000,000	16,000	700	900 F	7	11	8
10,000,000	8,500	60	1,000 F	5½	10	8
15,000,000	10,000	60	1,200 F	6	12	8



Write for Bulletin #112

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- Submerged Combustion
- Combustion & Heat
- Transfer Equipment

Check 4371 opposite last page

## CHEMICAL PROCESSING

with which is combined  
CHEMICAL PROCESSING PREVIEW  
and Chemical Business

*For the management team*

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April 1958

No. 4

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This issue of CHEMICAL PROCESSING magazine distributed to more than 50,000 members of the Management Team, wherever chemicals and chemical processes are involved:

### Basic Chemical and Chemical Processing Industries

Industrial inorganic & organic chemicals (acids, alkalis, plastics, synthetic fibers, explosives, etc.)  
Drugs & medicines  
Soap & cleansing products  
Paints, varnishes, lacquers  
Gum & wood chemicals (Naval Stores)  
Fertilizers

Animal & vegetable oils & fats  
Miscellaneous chemicals (cosmetics & toiletries, inks, insecticides, water treatment chemicals, etc.)  
Paper & allied products  
Petroleum, coal, coke-oven products  
Rubber products  
Stone, clay & glass products  
Atomic energy establishments

### Other industries utilizing chemicals or chemical processes

Food and allied products  
Textile dyeing & finishing  
Leather tanning & finishing  
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Machinery & equipment

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CHEMICAL PROCESSING

## THAT'S INTERESTING

From page 3

satellite, will supplant the generator's fixed field. Just as torque tends to retard armature of an operating generator, so will the air flowing past the missile be decelerated to prevent overheating. Same principle could be used to accelerate exhaust gases in rockets for greater thrust. (National Academy of Sciences.)

### Power from way down

They were looking for sulfur deposits at El Pilar, Sucre State, Venezuela, but the drill bit too deep and uncovered a natural source of under-



"No cavities? Drill anyway Doc, I feel lucky today."

ground steam. Venezuelan Sulphur Corp. is now working toward utilization of the steam to generate electric power. It has been estimated that as much as 400,000 kilowatts may be produced.

### Complete picture

A private "rogues' gallery" is helping Kearney & Trecker Corp., of Milwaukee, keep track of apprentice training. "Apprentice Development Board" contains all up-to-date information supervisors need to fill job openings. Since plant's apprentices usually number between 80 and 90, considerable time is saved because there's no need to consult numerous files and records.

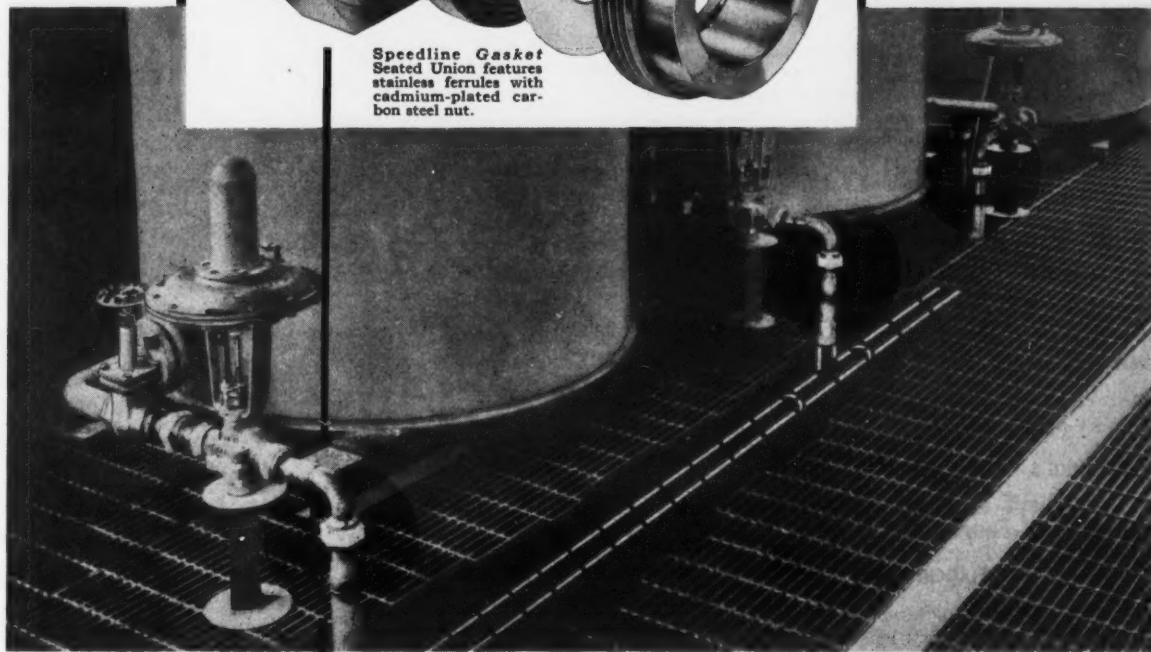
More "That's Interesting" items are on pages 86, 105, 242, 243.

APRIL 1958

## SPEEDLINE FITTINGS SOLVE LEAKAGE AND ASSEMBLY PROBLEMS



Speedline Gasket Seated Union features stainless ferrules with cadmium-plated carbon steel nut.



Here's the stainless steel union to eliminate troublesome ground joints. The Speedline Union is *gasket seated* to eliminate leakage . . . *bi-metallic* to permit easy disassembly and make-up *without* galling or seizing. It's available in two styles . . . for welding or expanding to low cost Schedules 5 and 10 pipe and the complete line of Speedline fittings.

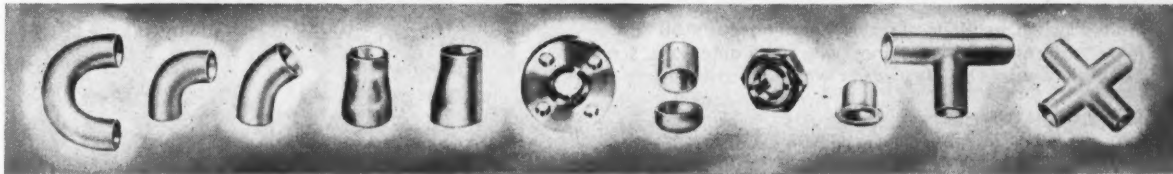
Advantages of Speedline Unions simplified piping problems at American Alcolac's Baltimore plant . . . permits ready removal of process lines located beneath floor grating when necessary. Use of Speedline Fittings throughout the plant's piping system reduced labor and materials costs to a minimum . . . maintained high degree of process purity demanded in process operations.

The *complete line* of Speedline Fittings with the exclusive "extra length" feature, offer many assembly advantages and cost savings not possible with conventional fittings. Request your copy of Speedline Catalog today.



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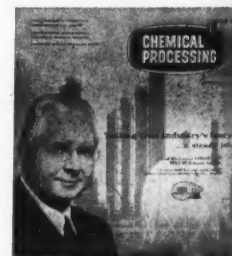
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#### THIS MONTH'S COVER

This month the chemical industry again observes Chemical Progress Week (April 14-18), sponsored by the Manufacturing Chemists' Association to promote better understanding between industry and the community. The cover shows Ernest Hart, Food Machinery and Chemical Corp. president and the 1958 MCA board chairman, against a background of Petro-Tex Chemical Corporation's butadiene plant outside Houston, Tex. (Petro-Tex is jointly owned by FMC and Tennessee Gas Transmission). On page 33, Hart discusses the advantages and problems of this communication, and the industry's obligation to be a "good citizen."



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• To subscribe to this magazine, see reader-qualification form opposite last page





over the editor's  
shoulder



#### Keeping up with the atom

Much is being written about the atom these days. All interesting reading too — if you have the time to look for it and the time to read it after you've found it!

For several months, CHEMICAL PROCESSING has been taking steps toward making this task easier. Its readers now can keep tabs on the fast-breaking nuclear field in only a few minutes a month.

Most of the information appears in Nuclear Notes (page 20) and Ideas (page 121). The material has been obtained from numerous sources. We've screened it, distilled it, and "capsulized" it for quick reading.

The articles concentrate heavily on chemical processing aspects of the field — things like radiation chemistry, fuel reprocessing, waste disposal, safety, etc.

Important power developments are covered too, since their implications bid to some day play a big role in the chemical industry. Take this month, for example. Starting on page 46 is a story about the big new 60,000-kw power reactor at Shippingport, Pa.

Yes, the atom is news . . . and CP is continually studying faster, more concise ways of passing on this news to you.

*Ted Minkbe*

Associate Editor

# BIRD CONTINUOUS SOLID BOWL CENTRIFUGAL SEPARATION of SOLIDS from LIQUIDS

*Could be the best method for YOU, TOO!*

EXAMPLE:  
**POLYVINYL  
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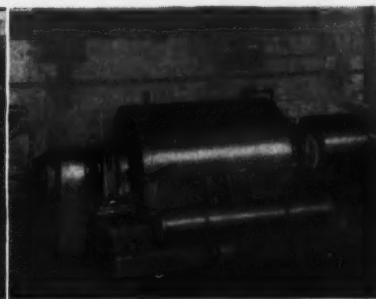
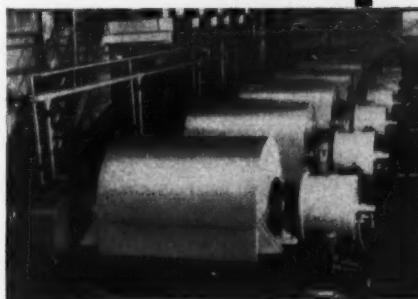
EXAMPLE:  
**AMMONIUM  
SULPHATE**

EXAMPLE:  
**ELECTROLYTIC  
CAUSTIC**

Everyone knows this is tough stuff to filter. The big bulk of it produced in this country is now put through BIRDS. They have replaced other separating methods almost completely. This is because the Bird was expertly designed for this specific application and is available in sizes to cover every capacity need.

With the BIRD, cake dryness is as low as 2-2½% and the cake can be washed. BIRDS save money because they run and keep on running without skilled attention. Solids content of the feed can vary all over the lot without throwing the operation off stride or requiring constant adjustment.

A major portion of U. S. caustic production employs BIRDS to remove the salt from both 50% and weak caustic liquors. BIRDS are also used for sulphate removal. Results are uniformly excellent. Operation is foolproof and trouble-free.



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what this BIRD  
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Check 4373 opposite last page

**Can't Legislate Human Relations**

Dear Sir:

The present predicament in which engineers find themselves cannot be corrected by unionization or by doing nothing about it. It is the job of good, careful, capable leadership with the interest of both industry and the engineers at heart.

Briefly summarizing the article in August 1957 CHEMICAL PROCESSING (page 38) by Joseph Amann, president of Engineers and Scientists of America, he states: "Collective bargaining in the engineering profession is needed more than ever today." He, like many others, believes that the dissatisfaction is caused by inadequate pay, lack of professional recognition, misalignment of salaries between beginners and senior employees, lack of security, too much routine, and poor working conditions.

Unionization is a synthetic attempt to legislate morality. It is recognized and voiced by many of the country's leaders that you cannot legislate morality. This means, in terms of industry, that you cannot legislate human relations. Unionization of engineers accordingly would create new problems rather than solve the ones we have.

There is no disputing the fact that engineers' salaries are inadequate. They are low because of inflation brought about by union pressure and management's capitulation in granting unearned increased wages. The cost of living goes up because of blanket wage increases and then those who get the blanket raises receive a cost-of-living increase that they themselves created. Now another round of cost-of-living benefits is anticipated because of the higher cost of autos, etc. There seems to be no end to this vicious inflationary circle. The 'white collar' workers, including engineers, are the victims of the spiral.

In many cases the best ideas come from the working force. They may or may not come

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**on ANILINE**  
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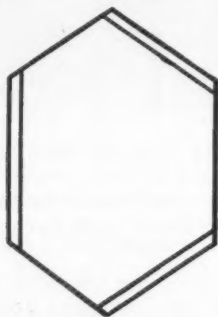
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If you use aniline, let us quote on your next order. Remember: Aniline is Our Middle Name!

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## YOUR OPINIONS —

-- and comments on the significant subjects carried in each month's **CHEMICAL PROCESSING** are important! We **WELCOME** your letters expressing your views.

Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in **CHEMICAL PROCESSING** others will have the opportunity of hearing your side.

### Perhaps you agree

with what has been written in these articles.

### Maybe you don't.

You might even have a thought or angle which wasn't expressed.

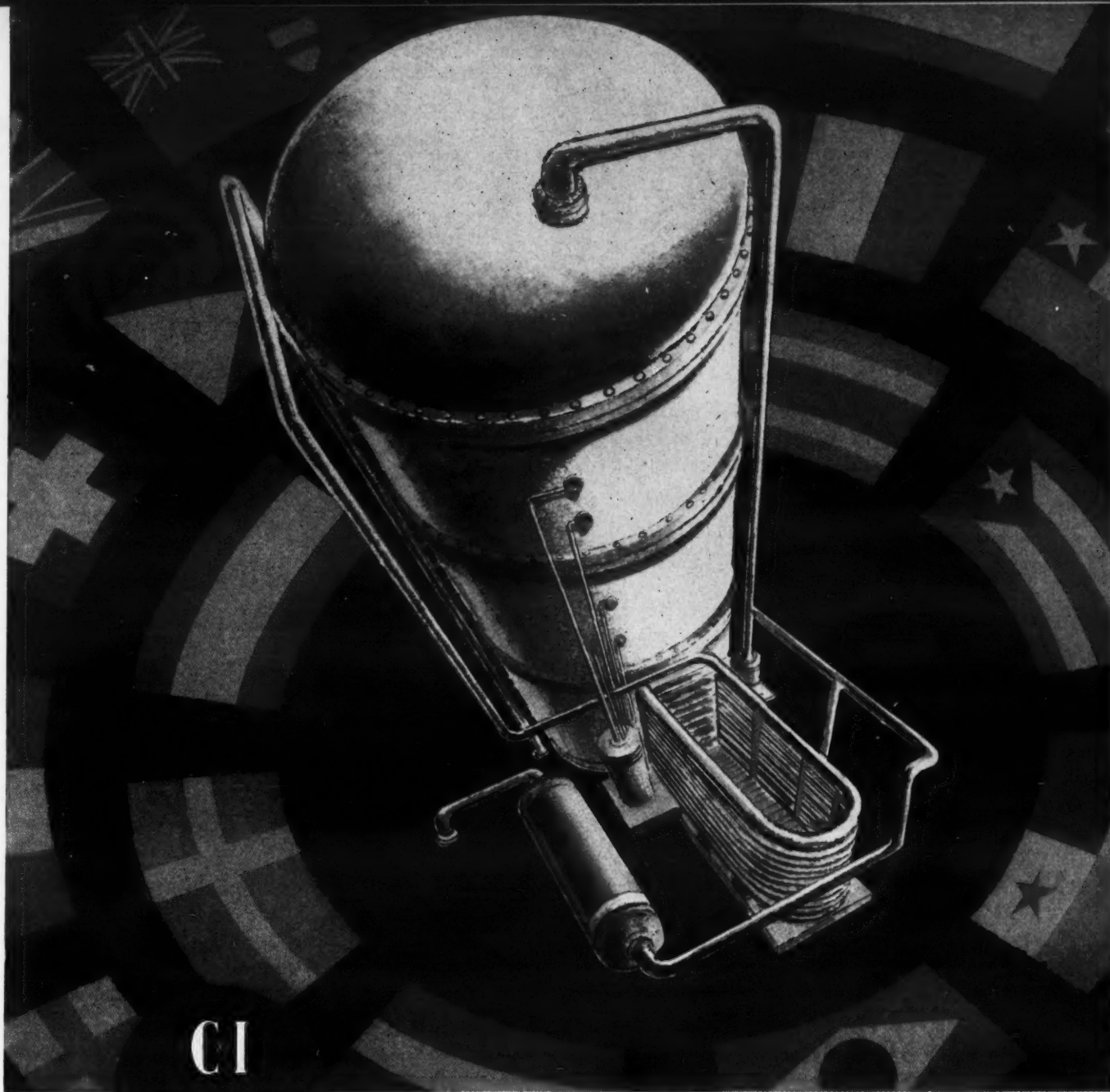
If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See opposite page.)

Address your comments to:  
The Editor  
**CHEMICAL PROCESSING**  
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Place, Chicago  
11, Illinois

For more information on product at right, specify 4375 see information request blank opposite last page.



APRIL 1958



# CI

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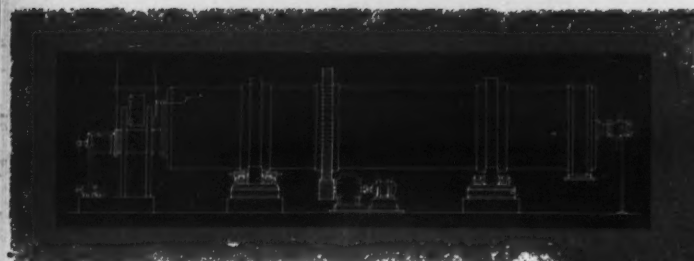


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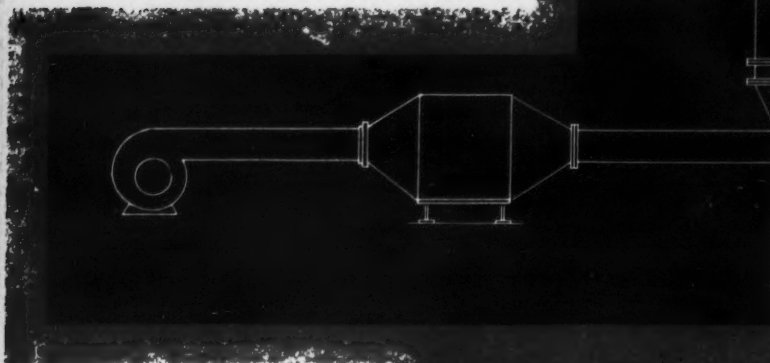
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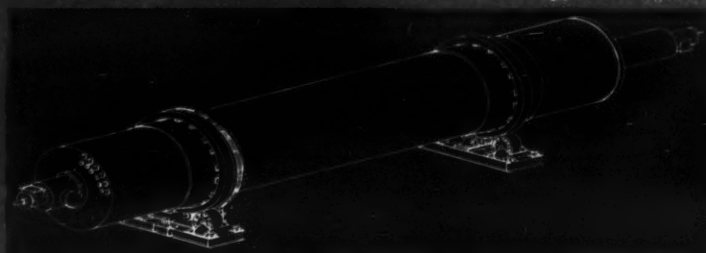




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**LETTERS**

*From page 8*

from people who are thinking in terms of what the union can do for them. They release their ideas because of mental pressure as well as for compensation for the idea, governed by established company policy. It is the creative instinct in mankind that produces ideas. Whether or not you have a college education does not matter, you have the power of creativity or you don't have it. Less than 10% of all people have it.

Engineers who have that power are often worth more to their companies on Saturdays and Sundays lying under a tree, free to concentrate, than when performing routine work delegated to them during the five days of the week — work that could well be done by an office clerk. Our problem is to liberate the engineer from menial duties.

What should be done? Engineers must be classified according to their ability and adaptability. If the personnel organization is not equipped to do it, there are management consultants who offer these services. The fact that an applicant has a sheepskin only proves that he has been exposed to the fundamentals of the type of engineering that he studied. He must be examined by tests to determine to which one of the various categories he is best fitted. These categories can be job-described and given an evaluation range. The engineer will soon demonstrate whether he fits in that category or another. In this way assignments of Junior and Senior Engineer, or Technician classifications on the basis of cronyism are less apt to be made.

How can we bring it about? By education and example, not legislation. Local and national engineering organizations can help by promoting forums and discussion panels at conventions, seminars conducted by colleges, or broadcast on radio and television. Groups can offer their services for this work as an extra-curricular activity for local concerns. Once a successful service is given, the plan will help promote itself.

**R. B. LUCE**  
Kenmore, New York



**The Four Day Week**

GENTLEMEN:

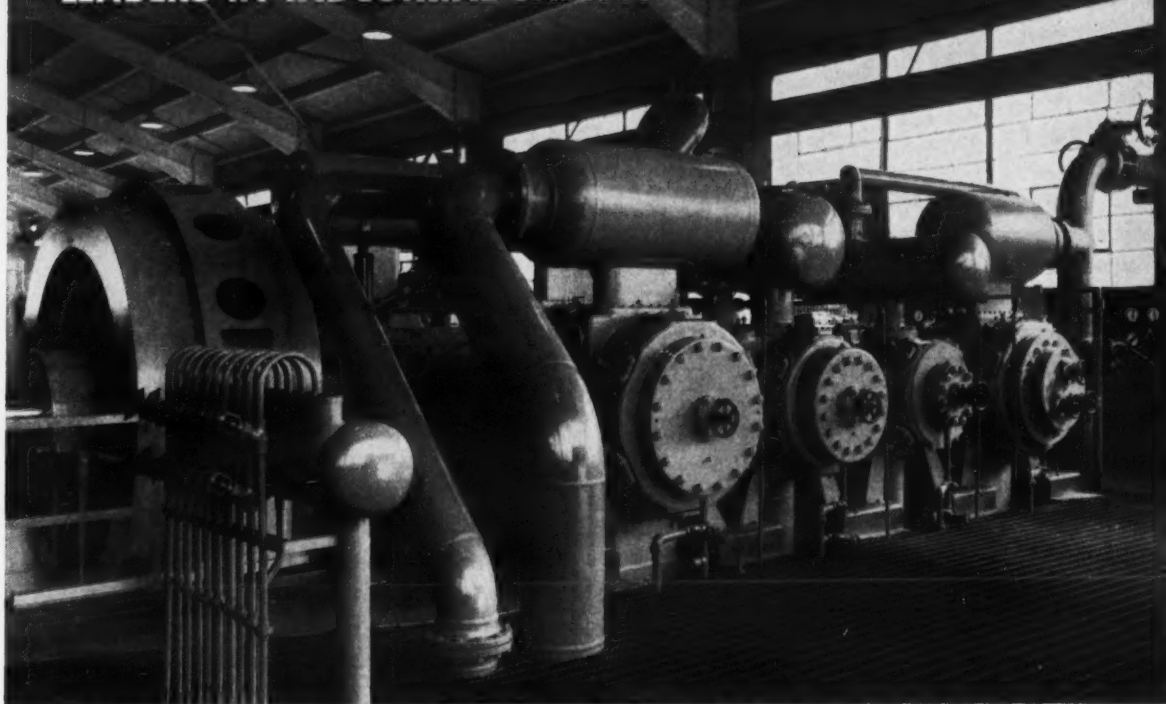
Concerning O. A. Knight's article on the shorter work week, (CHEMICAL PROCESSING, December, page 42) it is apparent that the author's economic thinking is not very perceptive, to say the least.

A false emphasis is placed on the physical amount of currency in circulation. This is only relative, and cannot by itself be used as a measure of value. The value of the dollar is related to the balance of material goods and services available, compared to the wants and purchasing ability of the consumer — i.e., the law of supply and demand. Mr. Knight feels that eventually labor productivity with the forty-hour week will be so high that we shall not be able to consume all the goods and services produced. The increasing complexity and actual value of our material needs demands more and more productivity in itself. Too, the day when human needs are so well satisfied is far in the distant tomorrow. It is this very increase in productivity (achieved by a higher and higher investment per employee) that has brought us where we are, and I doubt that many would agree that our material goals have been achieved.

One factor which has been entirely neglected is the ever-increasing diversion of our productive efforts to satisfy the defense effort of our country. Coupled with the expanding demand for more government services on all levels, this factor is manifested by our heavy tax burden. The gadgets of modern warfare are shamefully expensive in both the quantity of man power and technology and the quality and complexity involved. We may well find ourselves on somewhat of a treadmill — working harder and harder just to keep abreast.

It is unfortunate in a way that the old attributes of hard work and ambition are now decried. One wonders if we are better Americans for it.

VICTOR N. ANTAKI

**LEADERS IN INDUSTRIAL SAFETY:**

At its Memphis plant, Grace Chemical produces 300 tons of anhydrous ammonia per day. Three 4,000-h.p. compressors are the heart of this operation, each handling 3 different gases under varying intake and discharge conditions.

## Fire-resistant PYDRAUL AC protects huge compressor operations at Grace Chemical Co.

Turning out 300 tons of anhydrous ammonia per day depends on reliable and SAFE performance of the compressors. That's why Grace engineers at Memphis take every precaution to insure continuous operation. They choose fire-resistant Pydraul AC to lubricate air compressors, minimize carbon deposits and thus reduce fire dangers.

Compressor fire and explosion dangers lurk in flammable lubricants and their

residues deposited in compressed air cylinders and piping. Eliminate these dangers now in your compressors, any size, any make.

Conversion is easy . . . essentially, just drain your flammable fluid and replace with fire-resistant Pydraul AC. Send the coupon for your copy of the new Pydraul AC booklet . . . for the answers to your compressor lubricant problems.

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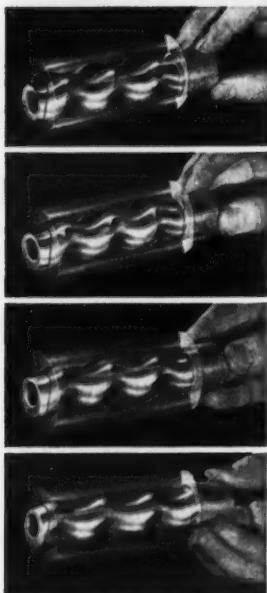
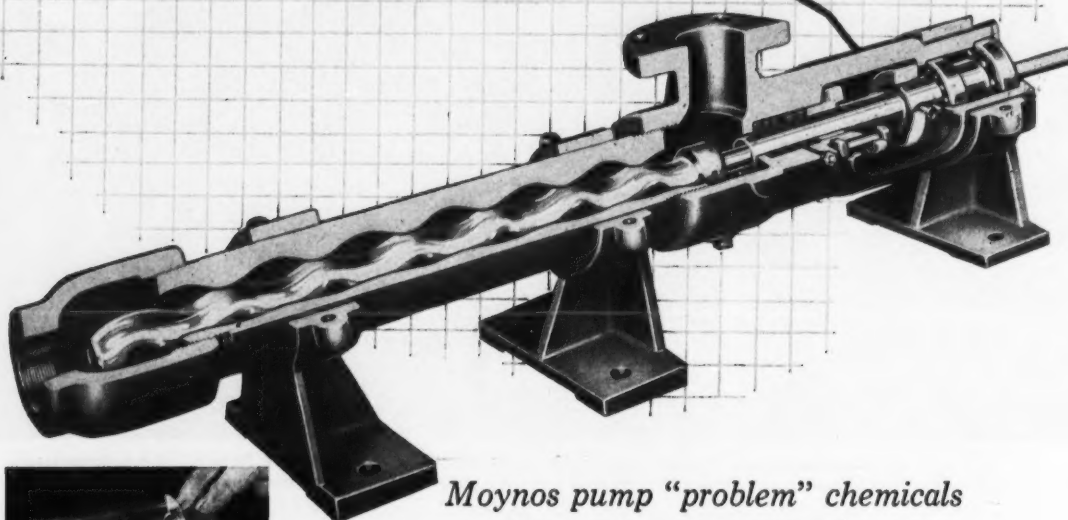
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**PROGRESSING CAVITY PRINCIPLE**  
A screw-like rotor revolves in a double threaded helical stator creating smoothly moving cavities.

*Moynos pump "problem" chemicals that ruin other pumps!*

Moyno Pumps have increased production and greatly lowered downtime on many chemical jobs where they replaced other type pumps which had run up prohibitive maintenance costs or failed completely.

Moynos can pump any chemical that can be forced through a pipe, whether a thin watery slurry or an extremely viscous material like rubber dough. A rugged screw-like rotor turning inside a double threaded stator forms "progressing cavities" which move chemicals smoothly. Fluids are pumped without turbulence or agitation. Discharge is uniform, nonpulsating.

Moynos last longer on tough chemical duty because the rotor and stator can be made of special materials that resist the tortures of abrasion and corrosion. Moynos need few or no repair parts . . . show little wear, even after long service.

If you are moving chemicals by hand or other expensive means because they're considered "unpumpable" . . . or if you want to decrease present pumping costs on "problem" chemicals, send us an outline of your problem today. Write for your free Moyno Pump Bulletin 30-CP.

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MOTORS



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HOISTS



MOYNO PUMPS



INDUSTRIAL PROPPELLAIR FANS

Check 4378 opposite last page



conventions  
and exhibits

April 1-3. The American Society of Mechanical Engineers, Conference of ASME Division of Instruments & Regulators, University of Delaware, Newark, Delaware.

April 8. Synthetic Organic Chemical Manufacturers Association, luncheon meeting, Hotel Roosevelt, New York.

April 10-11. American Institute of Chemists, Annual Meeting, Hotel Ambassador, Los Angeles.

April 13-17. Third Pacific Chemical Exposition, sponsored by The California Section, American Chemical Society, Civic Center exhibit Hall, San Francisco.

April 13-18. American Chemical Society, 133rd National Meeting, Civic Center Exhibit Hall, San Francisco.

April 14-17. American Society of Mechanical Engineers, Design Engineering Conference, International Amphitheatre, Chicago.

April 15-17. American Welding Society, Annual Welding Show, Kiel Auditorium, St. Louis.

April 18. Society of Plastics Engineers, Injection Molding Techniques, Conrad Hilton Hotel, Chicago.

April 20-23. American Institute of Chemical Engineers and Chemical Institute of Canada, Chemical Engineering Division, Joint Chemical Engineering Conference, Sheraton-Mt. Royal Hotel, Montreal, Canada.

April 21-23. American Oil Chemists' Society, spring meeting, Peabody Hotel, Memphis.

April 27-May 1. The Electrochemical Society, Inc., Statler Hotel, New York.

May 1-8. American Society of Tool Engineers, 26th Annual Meeting and Tool Show, Philadelphia Convention Center, Philadelphia.

... Meetings and shows of interest to the chemical industries

May 8-10. Western Material Handling Show. Great Western Exhibit Center, Los Angeles.

May 11-14. Fluid Controls Institute, Lake Placid Club, Lake Placid, New York.

May 11-15. American Society of Mechanical Engineers, Oil and Gas Power Conference and Exhibit, Bellevue-Stratford Hotel, Philadelphia.

May 19-23. National Fire Protection Association, Annual Meeting, Palmer House, Chicago.

May 26-28. Synthetic Organic Chemical Manufacturers Association, Annual Outing, Shawnee Inn, Shawnee, Pa.

May 26-30. American Management Association, National Packaging Exposition, Coliseum, New York.

May 31-June 8.ACHEMA 1958, 12th Chemical Engineering Exhibition and Congress, Frankfurt am Main, Germany.

June 1-6. Ninth Annual Industrial Research Conference, Columbia University, New York.

June 9-11. American Association of Spectrographers, Ninth Annual Symposium on Spectroscopy, Pick-Congress Hotel, Chicago.

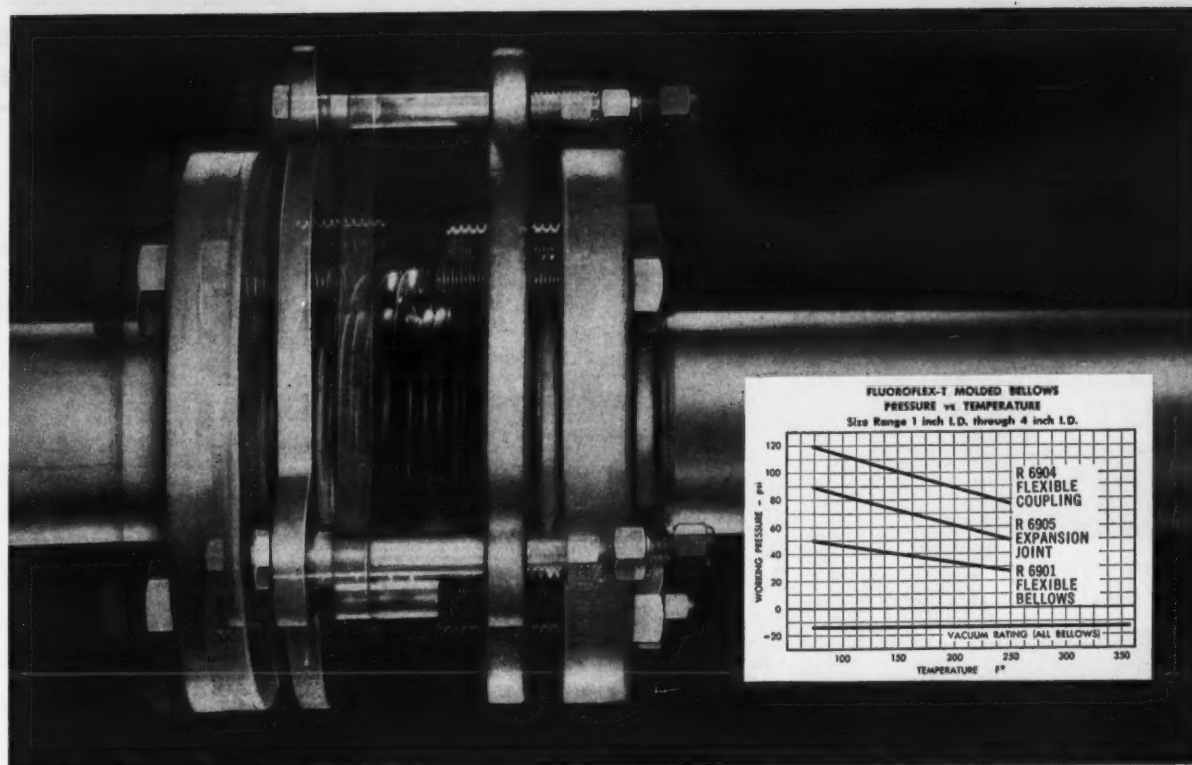
June 9-12. National Materials Handling Exposition, Public Auditorium, Cleveland.

June 9-13. Fourth International Automation Congress and Exposition, Coliseum, New York.

June 15-19. American Society of Mechanical Engineers, Semiannual Meeting, Statler Hotel, Detroit.

June 22-27. American Institute of Chemical Engineers, 50th Anniversary Meeting, Bellevue-Stratford Hotel, Philadelphia.

September 9-12. Tenth National Chemical Exposition, International Amphitheatre, Chicago.



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- **Work over wide pressure range** — and under full vacuum, too
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Fluoroflex-T bellows and flex joints are made of a special high density compound . . . Teflon at its best. Molding assures the optimum tensile and fatigue strength.

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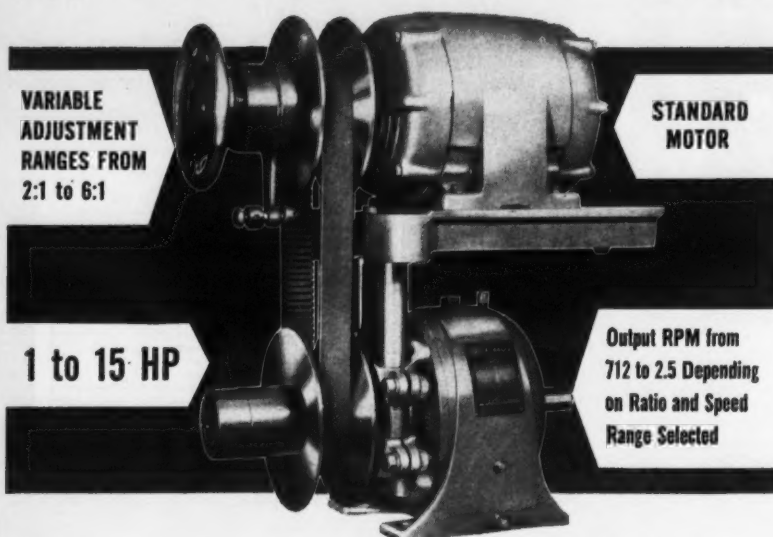


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VARI-MOUNT—the new Variable Speed Motorized Drive offers infinitely variable speed selection, greater flexibility of operation, wide adaptability, easier maintenance and the sound design you expect from Foote Bros.

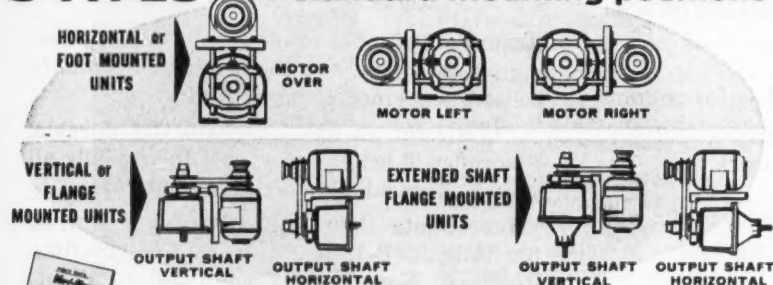
With a Vari-Mount, you can use your own motor—old or new NEMA Standard—or, the unit can be supplied with any standard motor of your choice. The Vari-Mount Reducer incorporates Duti-Rated Lifetime Gearing with file-hard tooth surfaces and tough, ductile cores for maximum life and efficiency.

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## Watching Washington

President versus Congress . . .

## TARIFF FIGHT IS ON

President Eisenhower's request for five-year renewal of Reciprocal Trade Agreements Act — with authority to reduce tariffs by 5% each year for five successive years (see *CHEMICAL PROCESSING*, January 1958, p. 41) — is still meeting traditional strong reaction in Congress. Unless extended by Congress, the law will expire on June 30. Increasing numbers of Congressmen of both parties — always looking to the home folks — want to smother it with restrictive amendments or let it die. Efforts are being concentrated on weakening the President's hand in administering the act — specifically, by giving Congress, rather than the President, final decision on US Tariff Commission recommendations for changes in quota and tariff rates. There are some who would support a bill to limit renewal to only one year.

President calls the Administration bill a keystone of US foreign economic policy. Secretary of Commerce Weeks says that the newly formed European Common Market makes it a must.

Chemical industry opinion, by no means solid, will give partial support to the Administration request — probably with some compromise for shorter time period and added proposals for limitations on percentage of reductions allowable each year.

In previous statements, selective tariff protection, as opposed to changing rates on an "across-the-board" basis, has consistently been advocated by industry spokesmen. Odds are the President won't get his way on this issue.

fauber asked for and got budget increase — \$115,000 over last year's. Areas of investigation will include "freedom of entry" in various fields; hearings on premerger notification bills; continuation of hearings on so-called "administered prices;" antitrust aspects of joint ventures by corporations (such as when two companies jointly create a third); and study of possible monopoly situations in foreign trade activities of domestic corporations.

Meanwhile, Senator Ke-fauver continues his effort to have S. 11 (his bill to amend the Robinson-Patman Act) reported out of committee (see *CHEMICAL PROCESSING*, July 1958, p. 24).

Lobbying pressures are reaching new highs on this. Alerted only in the last year, industry groups opposing the bill have stepped up efforts to persuade Senators to vote "no."

US Chamber of Commerce, previously neutral in this area, reports its members voted 10 to 1 in favor of the following policy declaration: "Good faith" meeting of a competitor's prices should continue to be an absolute defense to a charge of violation of the price discrimination provisions of the Robinson-Patman Act."

Within the Senate Judiciary Committee, those opposing the bill believe they have enough strength to hold it in committee for several weeks. If reported out, the bill will be

## Increased antitrust activity

You can count on increased activity by the Senate Antitrust and Monopoly Subcommittee. Chairman Senator Ke-



amended to make it more palatable to basic industry.

But Senator Kefauver is not alone in wanting to see his bill become a law. Persuasive pressures favoring the bill are being applied by retailers in food, drug, and gasoline fields, to name a few.

Co-sponsor on the House side, Rep. Patman, says he won't move with companion bill, H.R. 11, until Senate acts.

"Good faith" defense made more news recently as Supreme Court upheld Standard Oil of Indiana's dual price system in the Detroit area, ending a case that had been in litigation for 17 years.

Speaking for the majority, Justice Clark held that Standard of Indiana legally departed from its uniform price policy solely to meet competition.

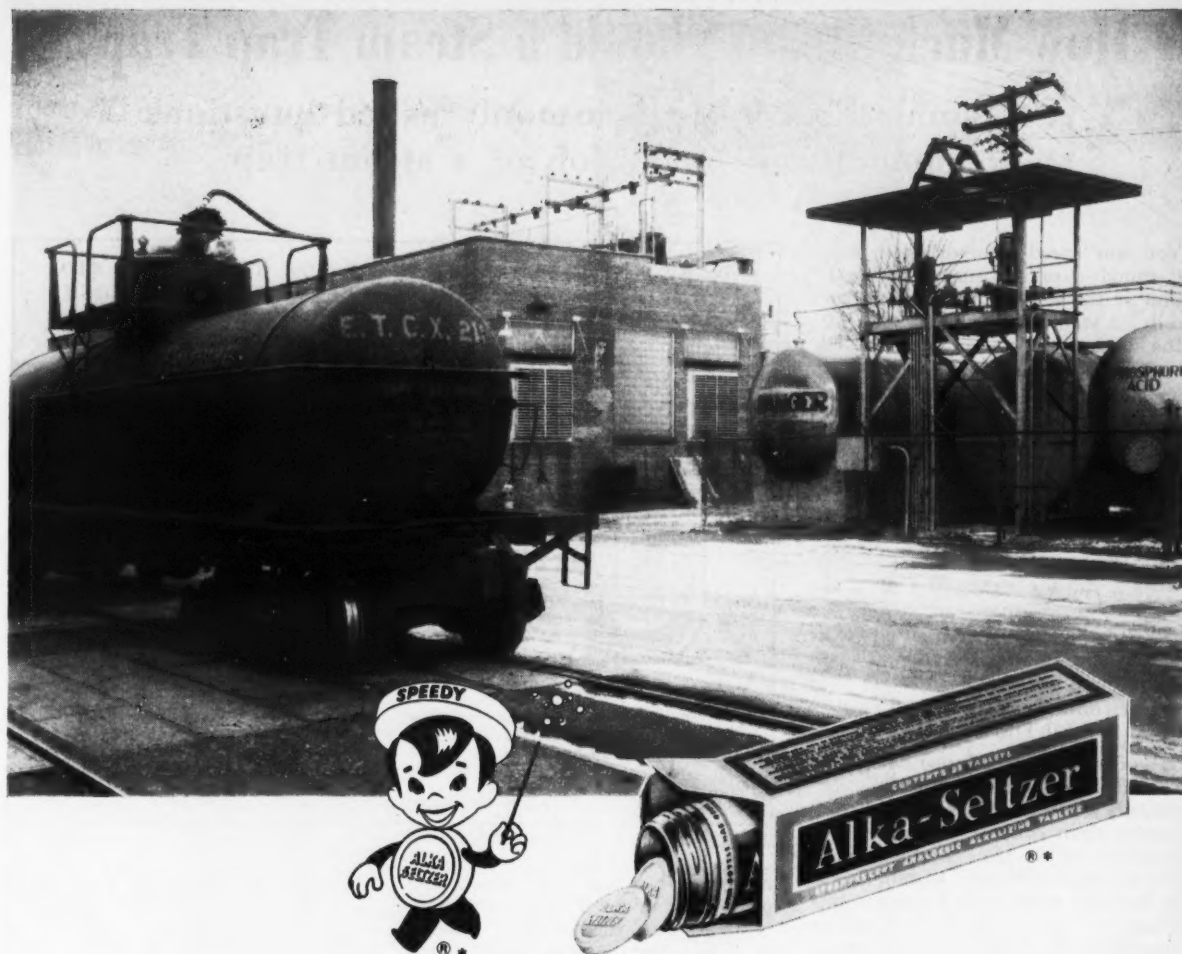
Further importance was attached to the issue by FTC because of similar cases pending against Gulf, Texas, and Shell Oil. The high court, however, ruled this claim of industry-wide scope was "not vital" to its consideration of the Standard of Indiana case. (A practical suggestion to the company who cuts a price to one customer in order to meet competition's price — set up and keep indefinitely a detailed file on the entire transaction.)

#### Food additive bills drag

With hearings scheduled for early in this session, it looked as if the House would finally move along on a bill to amend the Food, Drug, & Cosmetic Act of 1938. But hearings were postponed twice. None has been rescheduled as this column goes to press.

Why? The House committee responsible (Interstate and Foreign Commerce) has its hands full with FCC investigation being conducted by "Legislative Oversight Subcommittee." Delay may be considerable. In any event, any break would come too late for House action this session.

Of special interest is the latest in the long series of food



## NO HEADACHES HERE

Miles Laboratories, Inc. have relieved untold millions of headaches with their familiar Alka-Seltzer\* tablets, but they have no headaches of their own in handling the considerable quantities of acetic anhydride and phosphoric acid required in their operations. This job is done by the two LaBour Type G pumps seen in the photograph.

These pumps unload tank cars as shown, or tank trucks on the paved area, and also move liquid to process from the storage tanks. They've delivered a combined total of 19 years of dependable service, without one minute of

unscheduled time out. "They've never let us down," say the Miles people.

In the picture, note that the car is being unloaded through pipes under the pavement. During operation these are under less than atmospheric pressure, so there can be no loss of liquid. The packingless Type G's can't leak, either, and their only maintenance requirement is routine lubrication.

If you want dependable pump service without headaches, take a tip from the headache experts and specify LaBour.

\*Alka-Seltzer and the "Speedy" figure are registered trademarks of Miles Laboratories, Inc., Elkhart, Ind.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

# LABOUR

THE LABOUR COMPANY, INC. • ELKHART, INDIANA, U. S. A.



Check 4381 opposite last page

# How Much Steam Should a Steam Trap Trap?

... some answers to commonly asked questions about the primary job of a steam trap

You don't need a doctor's degree in thermodynamics to answer the question at the top of this page. Naturally, a steam trap should trap *all* the steam.

Unfortunately for you, the problem isn't quite that simple. After all, a shut off valve would trap all the steam . . . and condensate, and air, and carbon dioxide as well.

So we'd better amend the answer to the question this way: A steam trap should trap *all* the steam but *must* remove condensate, air and carbon dioxide as rapidly as they accumulate.

With this established, let's take a closer look at what's involved:

## A Steam Trap Should Trap All The Steam

If you've had experience with several different makes of traps, you already know that some trap steam better than others. The operating principle of the trap is what makes the difference. We like to talk about it because Armstrong traps are designed so that no steam can get to the orifice. The valve is always water sealed. Result: *More efficient steam utilization, lower fuel costs.*

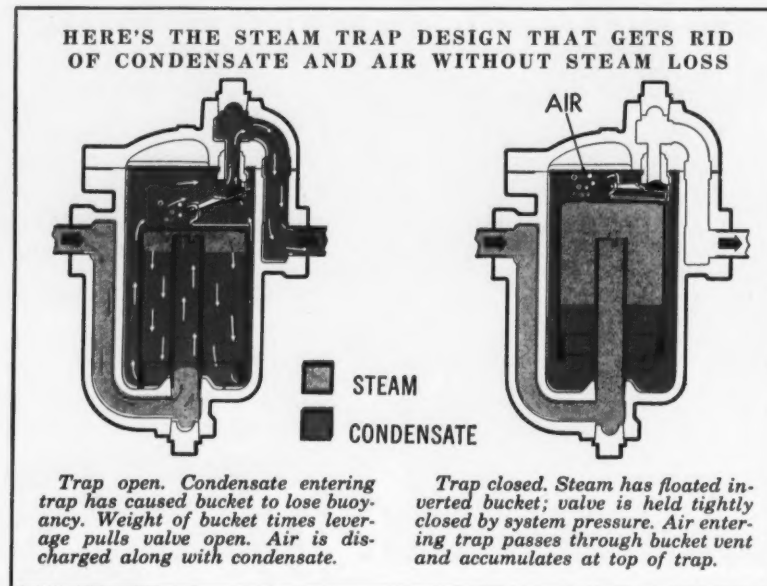
## A Steam Trap Should Remove Condensate

All traps remove condensate—after a fashion. For maximum efficiency in the unit being drained, though, the trick is to get it out without waiting for it to cool and without leaking steam.

Armstrong's water sealed valve takes care of steam leakage. The inverted bucket operating principle opens the trap for water regardless of its temperature. This means you get the condensate out as quickly as it accumulates. Result: *Higher temperatures and better heat transfer in steam heated units.*

## A Steam Trap Should Remove Air and CO<sub>2</sub>

Part and parcel of the condensate removal problem is removal of air as well as oxygen and carbon dioxide—two real troublemakers. Air tends to reduce operating temperatures and interfere with heat transfer. CO<sub>2</sub> goes into solution to form



corrosive carbonic acid which, for example, can eat unit heater tubes. O<sub>2</sub> aggravates the situation. Believe it or not, but all traps don't properly remove air and CO<sub>2</sub>.

By now, you've probably guessed that Armstrong traps *do* remove air and CO<sub>2</sub>. Armstrong design (see illustration) provides continuous venting of air and CO<sub>2</sub>. By opening suddenly, the Armstrong trap creates a momentary pressure drop to "pump" the air down to be vented. Result: *Higher temperatures, faster heat-up, better heat transfer and reduced corrosion.*

*Note: When required, specially sized air vents are furnished. For fast heat-up of low pressure on-and-off units, Armstrong provides open float and thermostatic air vent traps.*

## What's the Final Answer?

Summing it all up, you'll get the best service from steam heated units that are equipped with traps designed to trap *all* the steam and remove air and condensate as quickly as it accumulates. In our prejudiced viewpoint, this means Armstrong traps. More important are the several thousand users of Armstrong traps who have proved the point.

Before you make up your mind, though, consider the minimum maintenance requirements of Armstrong traps . . . and the convenient assistance your local Armstrong Representative provides. These are important plus values.

## Put Up or Shut Up

We're so confident that we "put up". Armstrong traps are unconditionally guaranteed to satisfy. So you can find out for yourself with practically no risk. If you're not completely satisfied with the way they do their job, you can get your money back.

\* \* \*

The 44-page Armstrong Steam Trap book goes into greater detail on these and other Armstrong features. It also discusses trap selection, installation and maintenance. Ask your Armstrong Representative for a copy or write

Armstrong Machine Works  
8804 Maple Street  
Three Rivers, Michigan



**ARMSTRONG  
STEAM TRAPS**

## WASHINGTON NEWS

additives bills — H.R. 10404, introduced by Rep. Williams "by request of segments of the interested industry." Which "interested industry" is one of Washington's better kept secrets. Rep. Williams, not yet committed to any one bill, says H. R. 10404 does not necessarily reflect his own views.

## Gas bill dead?

We have been given two pessimistic views on the outcome of the Natural Gas Bill. House Minority Leader Martin predicts the bill is dead for this session. Speaker Rayburn says passage is "doubtful," but he may call up the bill on the House floor.

## Pollution talks

National Air Pollution Conference has been called for mid-November in Washington, by Dr. Burney, Surgeon General, US Public Health Service. Purpose is to bring together leading authorities to consider "legal, medical, and industrial problems." Meeting will also serve to assess, at the half-way point, the five-year federal air pollution control program authorized by the Air Pollution Act of 1955.

## Transportation taxes

Railroaders and truckers, in a rare meeting of minds, got together to urge repeal of the wartime 3% excise tax on freight and the 10% tax on passenger fares. In spite of this concerted effort there appears to be scant hope for repeal. The Treasury would lose an estimated \$690 million in revenues.

## New tax plan

Corporate income tax plan aimed at stimulating industrial growth, yet not reducing Government's income from taxes, is proposed by D.S. Moffitt. See page 39.

Check 4382 opposite last page

## WASHINGTON NEWS

### Tech information center for US urged

Could up effectiveness of creative scientists by 25%

Prominent American scientists have said that the best way to find out what American science is doing is to read the Russian literature. Reports have it that the Soviets have such an efficient technical information dissemination set-up that data from Western technical articles is made available to Soviet scientists and engineers in even the remotest laboratories a few months after the original material was published.

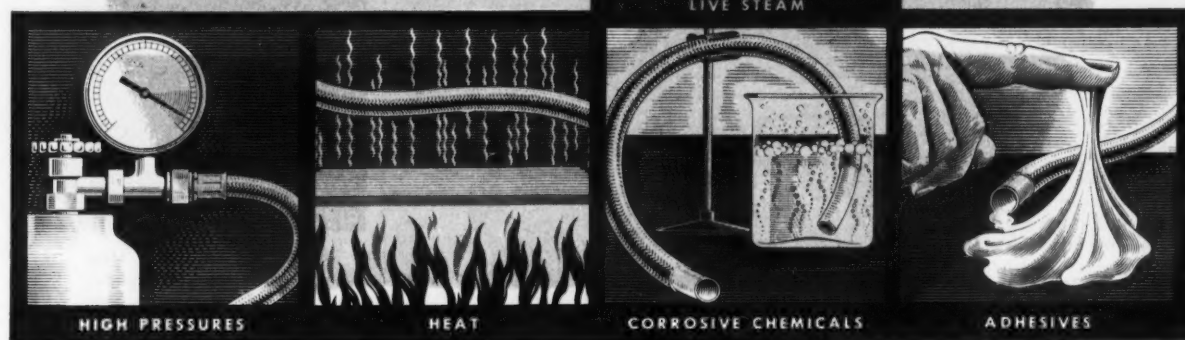
The establishment of a technical information center that would provide a similar service to research personnel in the US has been proposed by Stanford Research Institute. Such a center would increase the effectiveness of creative scientists and engineers by at least 25 percent, according to officials. Laborious literature searching, and time now wasted in repeating work already done and reported, but inaccessible, would be eliminated.

A well conceived and progressively operated information center would not be merely a highly inventoried warehouse of knowledge. It could also be a creative tool for analyzing and correlating knowledge as it is reported, and making it available where there is greatest need for it.

The Soviet All Union Institute of Scientific and Technical Information was founded in 1952. It is staffed by more than 2300 specialists and supplemented by 20,000 scientists and engineers who act as part-time abstractors and translators. Its function is to accumulate the published technical literature of the world (10,000 journals, 80 countries), process it, and make available the information it contains in the most useful form possible.

(Based on paper "A National Technical Information Center," prepared by Stanford Research Institute, Menlo Park, California.)

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require hose  
to meet  
these conditions



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Why not find out what hose of Du Pont TFE resin can do for you? See your hose dealer or write to: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept., Room 94, Du Pont Bldg., Wilmington 98, Delaware.



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\*TEFLON is Du Pont's registered trademark for its fluorocarbon resins, including the TFE (tetrafluoroethylene) resins discussed herein.

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with most modern features

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Put these modern features to work for you, greater profit at no additional cost.

Write for Bulletin KP



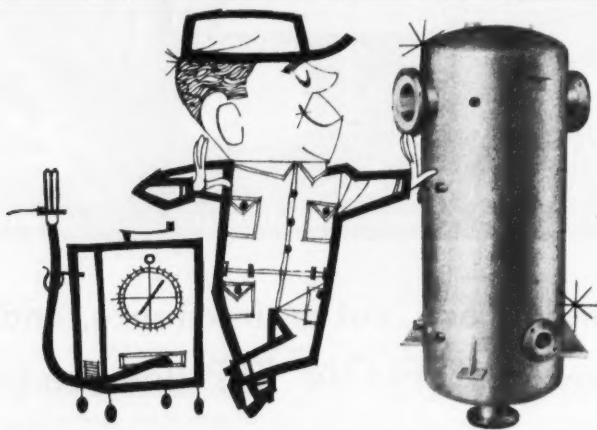
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looking ahead  
to next month

Quick previews of some  
highlights in May  
Chemical Processing

### Petrochemicals in Japan

Next month's Petrochemicals section tells the story of one new Japanese petrochemical plant and its far-reaching effects on Japan's economy. The plant, owned by Nippon Petrochemicals, has freed Ja-



Mr. S. Hayashi, (left) Manager Director of Nippon Petrochemicals, and Mr. Shoji Miwa, Plant Manager

pan from dependence on foreign sources of isopropyl alcohol and much of the acetone used in the country.

Here's an example of how "have not" nations are improving their lot through production of petrochemical products.

The story also discusses the engineering features of the operation, includes a flow sheet of the process from refinery gas to finished product.

**Eases handling, cuts dust,  
saves space to boot**

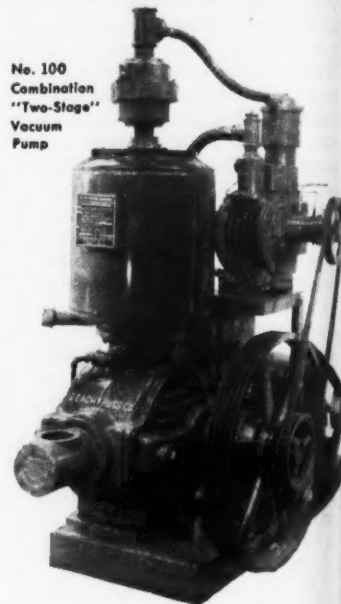
Unitized handling of palletized material requires stable loads, bags that fit snugly and hold their shape. But at American Cyanamid, packag-

the

*Beach-Russ*

## Combination "TWO-STAGE" VACUUM PUMP

No. 100  
Combination  
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Address Department 46

Check 4386 opposite last page  
CHEMICAL PROCESSING



ing of MBTS, a fine-powder rubber accelerator, created a dual problem: The bags were flabby, bulky, and difficult to handle, and the operation resulted in considerable dust.

In next month's Material Handling and Packaging section, Assistant Editor Ted Wett reports on his visit to Cyanamid, and tells how the company used a vacuum filler to solve its handling and dust problems, and saved 20 percent on storage space in the bargain.

#### Coal chemicals vs petrochemicals

Since 1941 the petroleum industry has become more and more active in production of aromatic chemicals, products that were once made exclusively from coal. Fly in the aromatics-from-coal ointment is that this production must be tied very closely with the production of steel — not with the markets for aromatics.

In CHEMICAL PROCESSING for May, Gene Medcalf, Manager of Cyanamid's Coal Tar Chemicals Department, discusses the puzzling economic problems that arise from such a situation. Looking far ahead, however, Medcalf foresees that: "Research . . . and the large reserves of coal and lignite will favor the long-run outlook for aromatics from coal."

#### Petroleum pipelines and plant location

Transportation cost is certainly one of the most important factors in any chemical operation, and hence is a major factor in the choice of location for a plant.

Next month, William T. Kopp, of William T. Kopp & Associates, consultants, discusses the proposition of transporting upgraded petroleum products by pipeline, freeing the chemical producer from some of the cost restrictions when locating a new operation, and letting him take advantage of some new areas.

Here's a new look at shipping methods and rates, and the suggestion of a growing midwestern petrochemical industry.

Another new development using

## B.F. Goodrich Chemical raw materials



Vinyl pipes in 4, 6, and 8-inch diameters are used for drop pipes. Photo shows pipe in well casing.



Corroded steel pipes pulled from well at Hollywood Beach Hotel, Miami, Florida.



SO THEY REPLACED THE CORRODED PIPE

## WITH GEON RIGID VINYL

DEEP wells are often used to provide cooling water for refrigeration systems. In the Miami, Florida, area wells supply salt water—fine for cooling but rough on steel drop pipes that in many cases have corroded and failed in less than 18 months.

Now rigid vinyl pipe made of Geon polyvinyl materials is used for the drop pipe which slips inside a driven steel casing. This vinyl pipe is unaffected by salt water, as well as galvanic corrosion. A built-up plastic O-ring at the bottom of each drop

pipe seals the pipe within the casing.

Geon vinyl pipe makes a big hit with installation crews too. It's lightweight and easy to handle. As the pipes are lowered into the casing, they are readily assembled with a coupling by solvent welding into a continuous length that may extend to a depth of 200 feet.

In any piping system where you have a corrosion problem, consider rigid vinyl pipe made of Geon. For informative booklet write Dept. LJ-4, B.F. Goodrich Chemical Company,

3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



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Check 4387 opposite last page

# 20 ESCO ALLOY CASTINGS 20Cb \*

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## CONTROL H<sub>2</sub>SO<sub>4</sub> CORROSION

ESCO Alloy 20 castings offer extraordinary resistance to sulphuric acid at the boiling point, in concentrations of 10% or less (by weight).

ESCO Alloy 20 is completely resistant to acetic, phosphoric, nitric and picric acids as well as many other corrosives. Only one of many ESCO Alloys available to control corrosion, ESCO Alloy 20 and 20 Cb can be cast in wall thicknesses and dimensions to meet the most exacting requirements. Static, Spuncast® and Shellcast facilities are available.

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## nuclear notes

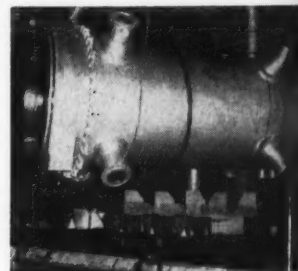
### US U<sub>3</sub>O<sub>8</sub> production 8640 tons in 1957

Uranium concentrate production for the US amounted to 8640 tons U<sub>3</sub>O<sub>8</sub> in 1957, according to the AEC. Receipts from foreign sources were 11,826 tons, making a total for both domestic and foreign of 20,466 tons. By the end of the year there were 16 mills in operation in the western US.

### Ship's reactor vessel weighs 100 tons

Reactor vessel for the nation's first atomic-powered surface ship has been completed. The 100-ton pressure vessel was built by Foster Wheeler Corporation.

The vessel flange is 18" thick and has 137" OD. Vessel shell is formed from 7"-thick alloy steel plate and has 105" diam. Measuring over 19'



The reactor vessel is more than 19' long

long, the reactor vessel body is made from manganese-molybdenum alloy steel with interior clad with stainless steel.

### Statutory indemnity for AEC contractors

The AEC is offering statutory indemnity to its major contractors, protecting them and the public against losses arising from nuclear accidents. Contractors and their suppliers engaged in the operation of reactors or chemical separation plants may be covered up to \$500 million.

... Significant news about atomic energy

### Big nuclear market overseas for US

Overseas nuclear development offers US technology \$3-billion market for goods and services over the next 10 years, according to a survey by Vitro Corporation of America.

"Most overseas nations are now in the early phases of their nuclear development programs. Some are faced with an immediate need for nuclear power and cannot afford the time to develop technological capabilities for commercial nuclear power. They must rely on US know-how and equipment to fill the gap," says R. L. Brown, vice president of Vitro International.

### Poll on national policy for atomic power

According to a poll conducted by the Atomic Industrial Forum, New York City, 169 organizations, representing 69% of total respondents, felt that US atomic power development activity should be expanded.

Of the remaining respondents, 24% indicated that development should be kept at present levels, 3% said that it should be cut, and 4% offered no opinion. Sixty-two percent were for a new national atomic power program, 33% said "no", and 5% had no opinion.

### High-temperature test reactor plans

A two-region system would permit constructing a high-temperature test reactor with today's existing materials, according to Nuclear Development Corporation of America. Reactor would operate at about 2500-3000°F and could be used for chemical processing applications.

The hot region could be cooled by piped helium gas. Refractory materials would insulate the hot region from

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processors create new products... new markets... new profits with Swenson spray drying methods

Swenson Spray Dryer tests products on a production-run basis

Many companies have determined the practicality of spray drying for their product in the full-sized Swenson Spray Dryer shown at right. Such a test, conducted in the Swenson Laboratory at Harvey, provides the complete data of a full-scale production run, and provides the assurance of product acceptability before a major investment is made. With these figures available, Swenson Engineers work with the company engineering staff on layout and design.

Spray drying is the fastest, and in many cases the most economical drying method used commercially. Drying action is almost instantaneous and uniformity of product usually eliminates the need for additional processing steps. You can determine the profitability of spray drying your product in the Swenson Laboratory.

This Swenson Spray Dryer is in operation at a large pharmaceutical house.

14

## Looking for ideas that build profits?

"Working for Profit", a new pocket-size booklet, shows how many processing companies simplify production, improve products and cut handling costs with Swenson and Whiting equipment. Shown above is just one of several pages giving a quick review of Swenson Evaporators and Spray Dryers for efficient, economical processing of chemicals and foods. The booklet describes plant-scale tests which can be made on your product.

These tests provide the assurance of product acceptability before a major investment is made. There's other helpful information on Whiting Cranes, Trackmobiles and every Whiting product used in your type of industry. Here are 32 pages of profit-building ideas, indexed for your convenience. Write for your copy. Swenson Evaporator Company, 15667 Lathrop Avenue, Harvey, Illinois.

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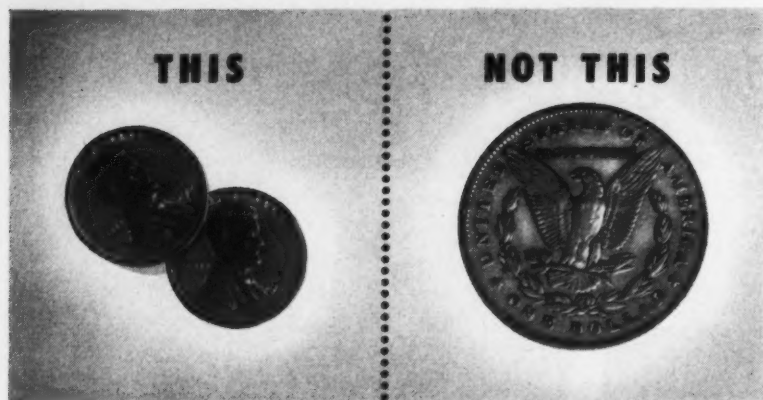


Check 4389 opposite last page



# DAY

## DUST CONTROL NEWS



### DAY "RJ" Dust Filter Operates for Pennies NOT Dollars

DAY has simplified dust filter design without sacrificing high efficiency. That's why there's so much interest in the DAY "RJ" dust filter. Simplified design means fewer parts, lower operating costs and less maintenance. With the DAY "RJ" costly compressed air, complicated valves, timers, shaking or rapping devices are NOT required. The entire counter air flow mechanism (the reason for the "RJ's" continuous, high efficiency) is operated by one small motor which varies from 1/2 h.p. to 1 1/2 h.p., depending upon the model selected.



The DAY "RJ" dust filter will handle light or heavy dust laden air streams. It filters fine, coarse, abrasive or non-abrasive dusts with outstanding efficiency ratings. Recent orders for 49 DAY "RJ" units came from 31 companies already using this filter — substantial proof of owner satisfaction. For complete specifications write to DAY for Bulletin G-579.

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Check 4390 opposite last page

## NUCLEAR NOTES

the surrounding cool portion of the reactor.

Cool portion would use conventional enriched metallic fuel elements. Inner hot region could use different types for test purposes. Heat from this region would be piped to the chemical process.

### Use of radioisotopes soars in 1957

Nearly 200 industrial firms started using radioactive by-product materials for the first time in 1957, reports the Atomic Industrial Forum, Inc. Total industries now using the materials is 1316. Over 1820 different installations are involved. Illinois accounted for the largest percentage of new users.

A complete report, "The Atomic Industry — 1957" may be obtained by remitting 50 cents direct to Atomic Industrial Forum, 3 East 54th Street, New York 22, N. Y.

### Fuse engineering talent for fusion research

Facility for advanced research on controlled thermonuclear reactions will be built at Princeton University by Allis-Chalmers Manufacturing Company and the Radio Corporation of America, as part of an AEC-sponsored program. Engineering talent of the two firms has been combined to design the Model C Stellarator, a device which it is hoped will generate temperatures as high as many millions of degrees. Unit is scheduled for completion in 1960.

### Aircraft carrier's reactor will use zirconium

Our first nuclear-powered aircraft carrier will use zirconium as a material of construction in the reactor. Also used in the core of the atomic submarine, Nautilus, the metal is currently being made by a new process at Columbia-National Corporation. Using nitric acid and tributyl phos-

## quality proved DARNELL CASTERS AND WHEELS



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Check 4391 opposite last page  
CHEMICAL PROCESSING

## NUCLEAR NOTES

phate, the extracted nuclear-grade zirconium has hafnium content of less than 100 ppm. Company has contract with AEC to produce 700,000 lb a year for 5 years.

### New AEC journal on power reactors

Current developments in power reactor technology are being covered in AEC's new journal, "Power Reactor Technology". Issued quarterly, it reports on both research and development results applicable to reactors generally and on progress made with specific reactor types. Domestic subscriptions are available from US Government Printing Office at \$2.00 per yr.

### Giant expansion joint for Dresden plant

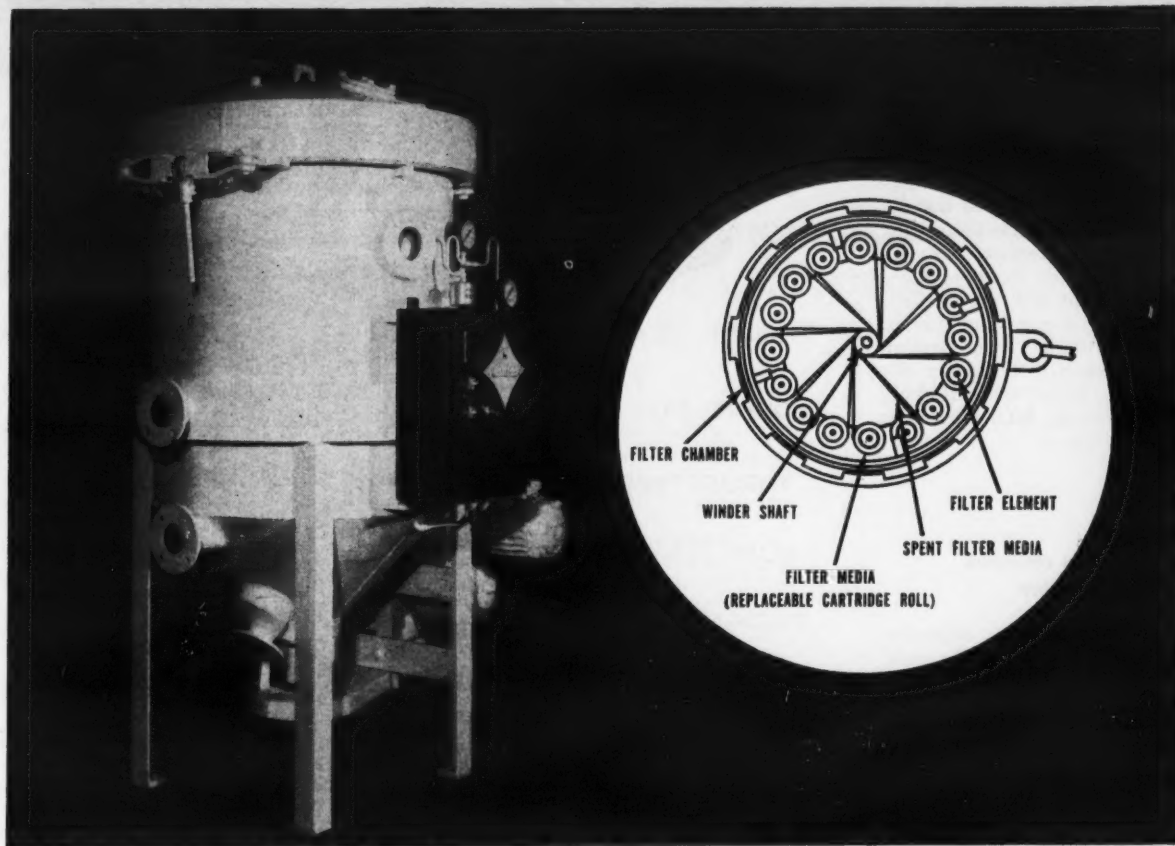
One of the largest expansion joints ever made for a nuclear power station is being built by Solar Aircraft Co., San Diego, Calif. Measuring 16' in diam, it will go into the huge \$45-million Dresden Nuclear Power Station being built 45 miles southwest of Chicago. The joint will be used to absorb differential expansion between a concrete housing and steel cavity in which nuclear activity takes place.

### Advanced epithermal reactor studied

An advanced breeder-type nuclear reactor to produce economic electric power from atomic energy is being studied by Atomics International, Canoga Park, Calif.

The unit, known as the Advanced Epithermal Thorium Reactor (AETR), would use sodium as a coolant, uranium 233 as fuel, and, if moderated, beryllium or graphite as a moderator.

In this concept, thorium is the fertile material, or the material which is converted to uranium 233, in the breeding process.



## NEW! Cyclamatic "Type 117" Filter automatically changes filter media

*... unit is ideally suited for low solids, high clarity operations*

Industrial's new Cyclamatic "type 117" continuous pressure filter consists of a series of vertical tubes arranged in a circular pattern which fit into a common manifold located around the periphery of the vertical chamber. Each tube consists of a central core with non-woven fabric or paper wound around it leading to a central winder spool... these multiple layers of filter media achieve sub-micron filtration with extremely low pressure drop. In addition to this, the rolls can also be supplied with a central core of diatomaceous earth, carbon or others, including desiccant material for jet fuels... this is an

exclusive design with Industrial. Frequent and costly interruptions in production are eliminated due to the automatic changing of filter media activated by a predetermined pressure drop across the filter. When this occurs the central winder simply winds off the contaminated top-most layer of paper and exposes a new uncontaminated layer.

This new filter by Industrial is absolutely fool-proof and can be extremely useful in filtration of jet fuels, cutting oils, shipping oils, paint wastes, effluent liquors containing radioactive particles, long cycle trap and polishing jobs, such as polishing beer, process waters and the like. Total filter areas range from 400 square feet to 7,500 square feet with filter diameters from 14 to 48 inches and can be equipped with or without a quick opening cover.

For complete details and specifications

write for BULLETIN 117.

# INDUSTRIAL

**INDUSTRIAL FILTER & PUMP MFG. CO.**  
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Check 4392 opposite last page

**Fume absorption plant  
for UKAEA**

The United Kingdom Atomic Energy Authority is installing a new fume-absorption plant at its uranium processing plant near Preston, Lancaster. Plant will recover nitric acid from nitrous fumes. There will be 6 absorption towers, each 6-ft diam x 40-ft high, filled with Raschig rings. Kellogg International is constructing it.

**AEC makes changes  
in organization**

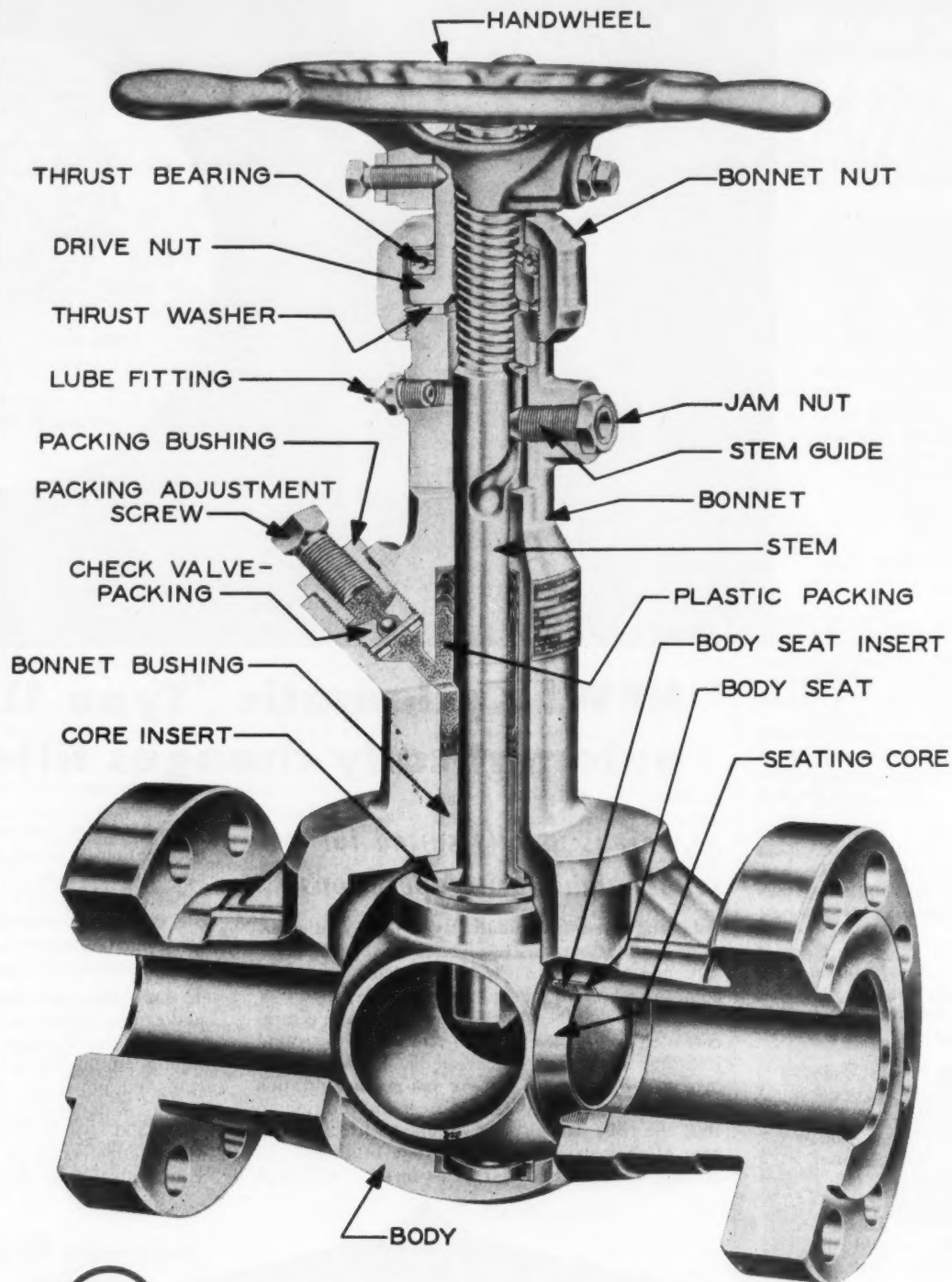
Changes in the organizational structure of the AEC provide for the separation of regulatory and non-regulatory functions in the civilian application program. Changes made are: 1) abolishment of the Division of Civilian Application, 2) establishment of the Division of Licensing and Regulation, and 3) establishment of a new office of Industrial Development.



"Shouldn't we . . .?"

Thanks to reader Carroll N. Bowman.

# IN FINE SHAPE &



WATCH FOR THESE ADVERTISEMENTS IN FORTHCOMING ISSUES OF CHEMICAL PROCESSING  
— MORE DETAILS TO FOLLOW



# READY FOR SERVICE

## ORBIT FORGED STEEL VALVES

### FOR LIQUIDS AND GASES

For The PETROCHEMICAL AND CHEMICAL INDUSTRIES

#### THESE FEATURES:

**1. NON-TURBULENT FLOW:**

In an open position the Orbit valve presents a full round straight through smoothly machined bore. There are no voids or cavities in the body or bonnet where pressures can build up from trapped fluids when the valve is either in an open or closed position.

**2. RISING STEM**

**3. ALL FORGED STEEL VAPOR TIGHT CONSTRUCTION**

**4. WELDED BONNET:**

Here the inherent safety of welded pressure vessels is recognized. This feature has been included in the Orbit valve by welding the bonnet to the body, which also strengthens the body and bonnet assembly so that they are not affected by vibrations or fluctuating temperatures.

**5. ADJUSTABLE STEM PACKING:**

A pliable plastic packing with a shredded base of "Teflon"\*, that is easily extruded is provided as a stem packing in all Orbit forged steel valves. This packing can be adjusted or added to while the valve is in service and under pressure.

**6. STAINLESS STEEL TRIMMED:**

All working parts that are exposed to fluid flow are made entirely of or are trimmed with stainless steel. Only those materials have been used that assure

maximum corrosion resistance for the valve's recommended services and to reduce wear on the working parts.

**7. SUPER-FINISHED STEMS:**

Stems are made of heat treated stainless steel. All stems are super-finished and are coated with molybdenum disulphide on the lower trunnions to eliminate the necessity of lubrication below the packing chamber.

**8. PHYSICAL DESIGN:**

The forged steel body and bonnet and welded construction are combined to give the Orbit valve a compact design, a modern streamlined look and reduced weight which allows installation in a minimum of space.

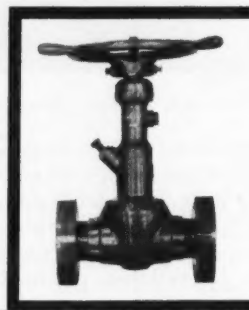
**9. NON-LUBRICATED POSITIVE CLOSURE:**

The advantages of Orbit's positive friction-free seating principle are: (1) Valve lubricants are not required for a shut-off or for the lubrication of any part of the valve's mechanism that comes in contact with fluid being handled in cavity of valve. (2) The possibility of fluid contamination carry-over from valve lubricants which lower catalyst efficiency has been eliminated.

**10. REMOVABLE HANDWHEEL:**

Helm type with finger grips.

\*Registered trade-mark for du Pont's tetrafluoroethylene resin.



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LITERATURE: Write Dept. B for Catalog 58-B and Service Manual No. 58.

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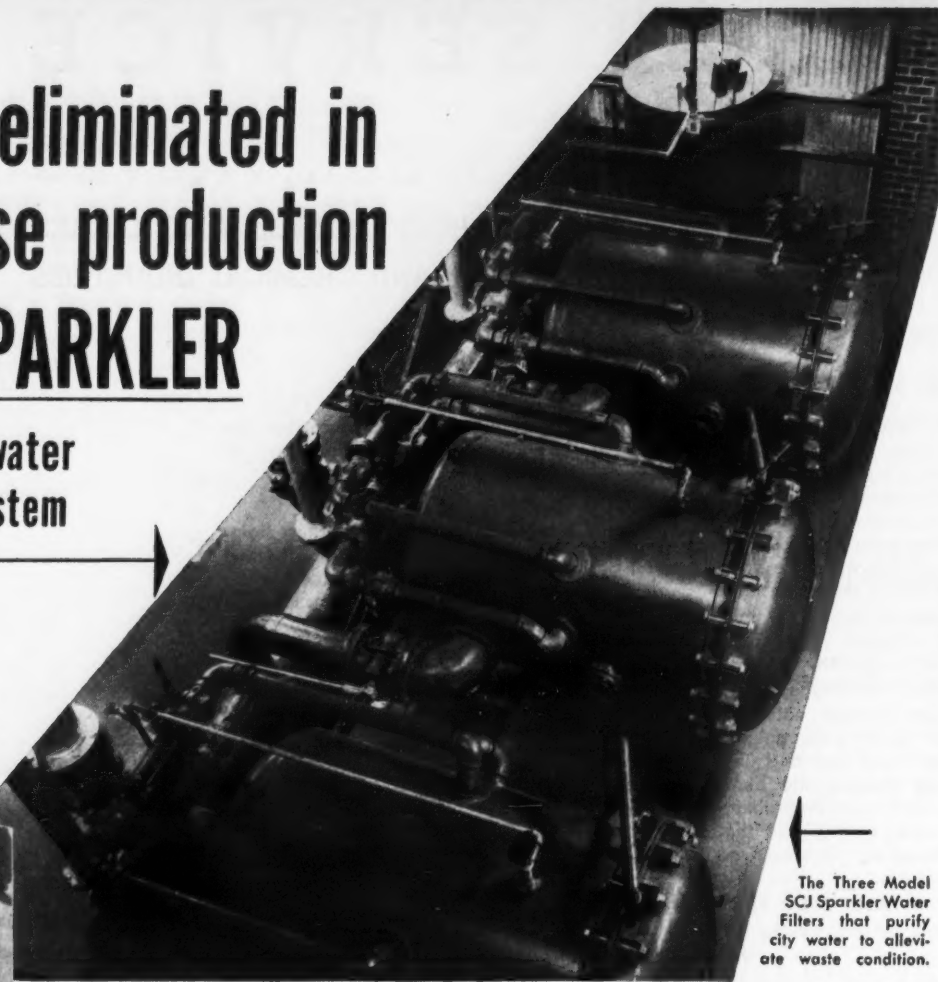
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# Waste eliminated in cellulose production with **SPARKLER**

engineered water filtration system



Pure white cellulose is produced with Sparkler filtered water.



The Three Model SCJ Sparkler Water Filters that purify city water to alleviate waste condition.

One of the South's largest producers of cellulose, the Southern Chemical Cotton Co., Chattanooga, Tenn., obtains its water from the City of Chattanooga. This is river water coagulated with alum and passed through gravity sand filters. The chemical and physical properties of this water vary over a wide range due to great fluctuations of demand and change in river conditions. At times conditions are very detrimental to Southern Chemical's cellulose production.

During the conversion of raw cotton linters into chemical cotton, a large amount of water is used. The fine cotton fibres filter out and retain any trace particles contained in the water. Thus, objectionable minerals would discolor and contaminate the material. This resulted in the production of off color cellulose, above specifications of certain elements.

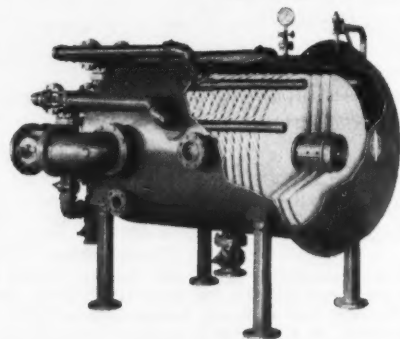
Three Model SCJ-40-25 Sparkler Water Filters, having a total filtering area of 1,200 square feet, were installed to alleviate this condition. These filters handle more than 5,000,000 gallons of water per day and efficiently remove the particles which formerly caused Southern Chemical's production difficulties. Plant officials credit their Sparkler water filter installation with eliminating a troublesome production problem and helping consistently to produce a product of satisfactory quality.

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Filtration engineering and manufacturing exclusively for over 30 years.

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Sparkler SCJ Self-Cleaning Water Filter — A diatomite, surface type filter available in capacities from 900 to 120,000 gallons per hour.

## **WHY THIS INTERVIEW?**

It wasn't very many months ago that some of the most common American humor concerned the Russian claims to have invented the airplane, the automobile, the electric light, and many other developments which had always been claimed for the Western World. Finally historians grudgingly attributed the first Ferris wheel (later named for G. W. G. Ferris who built a noteworthy wheel for the 1893 Columbian Exposition) to the Russians and then dismissed the subject.

The question didn't seriously come to public light again until early in the first week of October 1957 when the headline, "Soviets Launch Baby Moon," blazed across every American newspaper. On that day most Americans began to take Soviet Technology seriously.

But not all segments of American science have been in the dark concerning Soviet progress. Representatives of certain American industries and groups of scientists have made great efforts to study Soviet technical reports, keep abreast of their developments, and correlate them with our own research. Chemical Business Editor Bill Schremp interviewed one such man — Dr. J. G. Tolpin of Standard Oil of Indiana — and here brings his descriptions and opinions of the Soviet chemical industry.

Dr. Tolpin, a long-time student of Russian science and industry, is technical associate in the research department of Standard, coordinating the foreign literature and patent information of the company. From 1937 to 1947 he edited the *Survey of Foreign Petroleum Literature*.

A native of Russia, he left the country shortly after the revolution of 1917 and is now a naturalized citizen of the United States. His education and training include chemistry and chemical engineering at University of Kiev, University of Jena, and Columbia University.

Trained as an organic chemist, Dr. Tolpin specialized in plastics and catalysts. He is the author of a number of papers on science and industry in the USSR.

In 1944, he organized the first university course in Russian for scientists in this country at Northwestern University, where he is a professional lecturer.

In an exclusive interview with  
Dr. J. G. Tolpin, an authority on Russian  
industry, CP asks . . .

## QUESTION: HOW ABOUT RUSSIAN CHEMICALS?

**Q** — First of all, Dr. Tolpin, could you describe the Soviet chemical industry simply, in terms of size, breadth of production, and products in relation to our own US chemical industry?

**A** — When you speak of a comparison between the Soviet and US chemical industries, I think you get into an area where a basic concept must be dealt with, without which any comparison is irrelevant. In the US, any industry develops as a result of free competitive forces and free interplay of supply and demand. In the USSR, this principle has been abandoned, and the entire industry is being developed in accord with an overall plan drawn up by a group of experts — a master scheduling department, so to speak. Headed by a Cabinet Minister of great importance, this group compiles a plan in great detail. After each manufacturing unit gets its assignment, it knows exactly what is expected of it at any given moment.

Originally it was thought by the outside world that such a grandiose scheme wouldn't work — today we know that, by and large, it has been successful, even though at great costs to the population.

Here's an example of why you can't compare the two industries:

You might want to compare them in terms of sales, or dollar output. But in Russia, prices of basic products are often assigned — they don't really reflect anything. The prices charged between Russian industries are of no concern to the outside world.

We can, however, arrive at some figures on Soviet industry. Today we have data released by the Soviets — and I have reason to believe that there are no

better data available — covering their production. By taking their figures for actual production of basic commodities and relating these figures to those of the same commodity in the US, you can arrive at a very good comparison of the industries. Actually, the overall production of all Soviet industry is on the order of one-half to one-third that of the US. The total chemical production in the USSR is probably just under

one-third that of the US. But this can be misleading unless you understand the distribution patterns.

**Q** — Can you describe the distribution patterns and explain how they affect the overall Soviet industrial potential?

**A** — The distribution patterns of Russia describe Soviet industry, as distinctly different from industry in any capitalistic society, better than anything else, because they indicate the objectives of the planners as of the moment. In as late as 1955 — and I think this is the most important figure — the entire production of Russian industry was guided toward capital and defense goods to the extent of 70.6 percent, leaving only a little over 29 percent for consumer goods.\* However, in the chemical industry, the situation is even more acute. In 1955 the total industrial production, in percent of 1940 production figures, was 350 percent; for the chemical industry it was 468 percent; and for the plastics industry it was 855 percent.

One would think from these figures that the Soviets are flooding the consumers with chemical

*\*In the US, the division is roughly the reverse.*



Russian born and educated, Dr. J. G. Tolpin has spent many years translating and surveying foreign literature and patent information. His work includes a vast library on "The Survey of Foreign Petroleum Literature"



## HOW ABOUT RUSSIAN CHEMICALS?

From preceding page

products. Yet only 14 percent of the chemical industry production goes into consumer goods. This explains how an industry only one-third the size of ours can support the USSR defense effort and its industrial expansion as well as, and in some cases better than, our own chemical industry supports ours.

**Q — For purposes of comparison, can you state some production and capacity figures on some basic chemicals?**

**A —** In 1956, production of crude oil reached 92.2 million tons; sulfuric acid, 4.7 million tons; mineral fertilizers, 12 million tons; 92% caustic soda, 694,000 tons; soda ash, 1.65 million tons; synthetic dyestuffs (1955), 81,000 tons; cement (1955), 24 million tons; man-made fabrics (1955), 121,000 tons; paper (1955), 2.1 million tons.

There is no reason to discuss total capacity figures for Russia for this reason: Because of the overall integration of the chemical industry, and indeed all of Russian industry, you can assume that the facilities will be running at full capacity. They would never be in the position of working at, say, 70 percent of capacity, as we do sometimes in the US.

**Q — What is Russia's position as a world chemical producer? Do they export chemicals or otherwise influence the world markets?**



"Entire Russian production has been guided toward 70.6% for capital and defense goods, a little over 29% for consumer goods" (US figures are roughly the reverse)

**A —** The Soviets do not export chemicals as an economic activity familiar in the US. It is estimated that in 1955 foreign trade business of the USSR constituted 313 percent of the world's import-export business, amounting to 6.2-billion US dollars. The Russians have a great deal of chemical trade, as well as general trade, with their satellites. As a matter of fact, 80 percent of all Russian foreign trade is with their satellites.

Of course the Soviets export a great deal of material, equipment, and know-how — even whole plants—to countries other than their satellites. But this exporting is for political purposes, not trade purposes. For the USSR, marketing is just one more way to exert political pressure.

**Q — How do the Russians carry out their chemical business? Do they have "companies" similar to those in the US? How does the business of Russian chemicals function?**

**A —** There are no companies, as we know them, in Russia. They do, however, have what are known as "combines" ("ob'edinenie") and "trusts." (The organization of independent economic regions, which is in progress now, will change the relationship and form of some of these units.) These organizations have supply contracts and carry on business among themselves. This might strike you as strange



"You might think of the Russian chemical industry as one enormous company . . . selling only to the government"



Russian synthesis laboratory. Dr. Tolpin states, "Greatest problem of all Russian industry is greater utilization of basic research"

in such a well-planned industry. Here's the reason: The contracts are for the protection of the plant managers who depend on other plants for supplies and raw materials. The manager of a plant making phenol-formaldehyde resins will try to have a contract with his phenol source which will exonerate him in case phenol deliveries fall behind and force his own production down.

It might interest you to know that, while the scientists are among the best paid and most esteemed people in Russia, and, by comparison, lawyers do not fare nearly as well in the USSR, there is one group of lawyers which occupies a better position than other members of their profession. The activities of this group resemble some of the activities of the corporation lawyers.

Back to the companies . . . the combines don't have any identity as the American companies do,

nor, of course, are the individual production plants self-governed. You might think of the Russian chemical industry as one enormous company, making all of their own products in hundreds of individual plants, and selling only to the government.

**Q — What are the major strong points of the Russian chemical industry?**

**A —** The basic strong point of the industry is the fact that they have an assured future, that there are few variables in their operations. And what was in the past one of their weaknesses, they have turned into a considerable strength — the supply of engineers capable of translating the basic research into working production. The Russians have always had a small but very effective group of basic researchers. In fact, they have a history which sometimes makes our laughing at their claims to be first in various fields a little ridiculous. For example, one of the early Russian scientists, M. V. Lomonosov, founder of the Russian Academy of Sciences in 1725, was definitely a scientific genius. One of his papers, published in 1739, was titled "The Elements of Mathematical Chemistry." His case is not an isolated one.

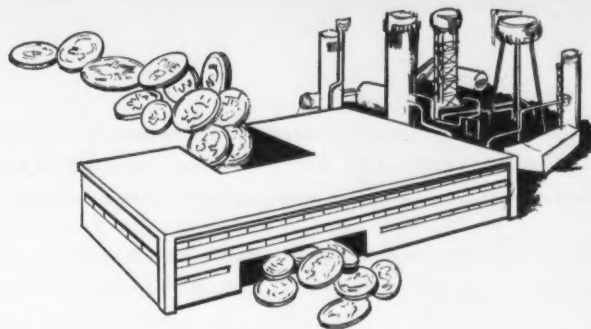
But until a few years ago, the Soviets didn't have sufficient engineers to utilize their ever-expanding research. Today they do. And the engineers are no longer being trained just to operate a specific industry; they are trained to have a broad view of production in general and can

To page 64



"Russian chemical plants are modern or not, depending on where you look. 'Responsible' industries (m'ssile fuels, for example) are as modern as they can possibly be . . ."

As capital available for new plants and expansion becomes tighter, payout time attains even greater importance. What should you consider in determining . . .



## How Soon . . . Should a chemical plant pay out?



Walter E. Lobo, a consulting engineer with the firm of Devys & Lobo, draws on 28 years of experience with M. W. Kellogg Co. for knowledge of chemical plant economics. He received his education at Massachusetts Institute of Technology and Louisiana State University. A licensed professional engineer, Mr. Lobo is a director of the American Institute of Chemical Engineers and the Engineers Joint Council.

WALTER E. LOBO, Consulting Engineer  
Devys & Lobo, New York, N.Y.

with no return; the shortness of the period compensating for the absence of a stipulated rate of return.

Let's consider various payout times and their methods of calculation based on a constant annual profit with straight-line depreciation, assuming no borrowed capital and 100% capital recovery with no return. Payout time will vary depending on whether we consider earnings before or after taxes, or whether the return includes earnings alone or with depreciation.

Just to give an idea of what type of figure might be acceptable, let us consider the following simple case:

	Millions of Dollars
Plant Investment	10
Depreciation 10%/yr	1
Profits/yr (before taxes)	4
Profits/yr (after taxes)	2

Payout times:

- 1) Using before-tax profit without a depreciation allowance  
 $10/4 = 2.5$  yr
- 2) Using before-tax profit plus a depreciation allowance  
 $10/4 + 1 = 2.0$  yr
- 3) Using after-tax profit without a depreciation allowance  
 $10/2 = 5.0$  yr
- 4) Using after-tax profit plus a depreciation allowance  
 $10/2 + 1 = 3.33$  yr

Here we see that with the figures

given, the payout times vary from 2.0 to 5.0 years.

Of course, these simple calculations must be based on consideration of many factors. In assuming a constant annual return we must consider what a fair rate of return would be. The range of expected return as ratio of net profit to investment for the chemical industry is 7 to 27%. It has been suggested that it include these three elements:

1. Current rate of interest obtainable on a conservative investment.
2. A factor of safety which considers the uncertainties involved in cost estimates and evaluation of pertinent factors in the project or situation.
3. An element to represent the hazards which would appear to be inherent in the project.

### Factors to be Considered

Now, the interest rate obtainable on a conservative investment is readily determined at any given time. Possibly, in these days of relatively rapidly changing interest rates, consideration to change must be given.

The factor of safety, to compensate for the uncertainties involved in cost estimates and evaluations, is also not too difficult to set. Determination of the accuracy of such figures is part of the job of the engineer who is

assigned to make the study.

However, the element which represents the hazards which would appear to be inherent in the project covers a multitude of considerations, all of which should be considered and none of which can be exactly defined. What are some of these factors which management must take into account in deciding on a fair rate of return, and thus, the required payout time?

**Market factors** must be studied. First, it is necessary to prepare or have made a good market survey to arrive at an accurate prediction of the probable growth curve of the proposed product. However, this should not be limited to an extrapolation of the present trend, but should include predictions of the growth of the various uses for the product, actual as well as probable. Even this is not enough. The growth of competing products, or substitutes, should be investigated, as their acceptance may change the indicated market trend and very seriously hurt the profitability of the venture.

What percentage of the existing and future demand will the proposed plant plan to meet? Obviously, if it will throw on the market a good proportion of that demand, this will lead to over-supply, with a consequent drop in price. The profitability of the venture can be greatly affected by the necessity for operating at less than design capacity because of over-supply. What will be the break-even point for the plant? Will it be at a high or a low level of production?

To page 99

**H**ow soon should a chemical plant pay out? A simple answer to this problem would help inestimably in making perplexing management decisions in the expanding chemical and petrochemical industries. Unfortunately there is no simple answer.

First, let us define our terms. What do we mean by "payout" or "payout period", and how is it calculated? Here, the answer is not always the same. In some companies there must be 100% capital recovery, plus a minimum attractive return within the period. In others, the requirement is merely for 100% capital recovery

At Sun Oil's Marcus Hook Refinery, recent increase in plant throughput has reduced by 40% the time required to empty Thermoform catalytic cracking unit's catalyst surge hopper.

Control of catalyst level in the hopper is now a more critical factor in fire prevention. Key instrument is an —

## Accurate, Fast-response Electronic Level Controller Run by Remote Control

FRANK E. McELROY, Associate Editor  
With DR. E. N. SHAWHAN, Manager  
Applied Physics Section  
and MEMBERS OF HIS STAFF  
Sun Oil Company

**PROBLEM:** The Sun Oil Company has two elevator-type Thermoform catalytic cracking units at its Marcus Hook Refinery in Pennsylvania. In this type of unit, regenerated catalyst flows continuously from a surge hopper downward through a seal leg into the reactor and out through the catalyst flow control valve to the kiln elevator. (See diagram.)

Recent increase in plant throughput has reduced the time required to empty surge hopper from five to three minutes, making catalyst level control in the vessel a more critical factor in fire prevention.

Weight of the column of catalyst above reactor is used to maintain catalyst flow against reactor pressure. Catalyst column also serves to prevent escape of oil vapors from reactor

to atmosphere, thus preventing fires. Catalyst level in surge hopper is maintained by regulating catalyst flow control valve.

Problem is complicated by the fact that catalyst pellets and dust carried with them are extremely abrasive, and their temperature is above 1000°F. Mechanical level-sensing devices require considerable maintenance and may fail without warning. Gamma-ray absorption-type level gages are slow in responding to level changes and give relatively poor control in this type of application.

**Solution:** Company's Applied Physics Section tackled the problem, developed an electronic capacity level gage. In this system, emphasis has been placed on reliability and ease of maintenance.

Here's how it works. Level-

sensing element or probe is a vertical section of steel pipe or stainless steel rod inserted in catalyst bed to form the insulated plate of the capacitor. As the diagram shows, side of the vessel is the grounded plate, with catalyst as the dielectric.

Probe insulation is made of quartz for strength and for good insulating properties at the elevated temperature. Sensitive measurement of capacitance activates control unit, as change in catalyst level covers or uncovers a portion of the probe.

The electronic unit is mounted in control room and connected to a transmitting unit at point of measurement by one inexpensive coaxial cable about 300 feet long. (If necessary in other applications the coaxial cable may be as much as three-quarters of a mile in length. This length is

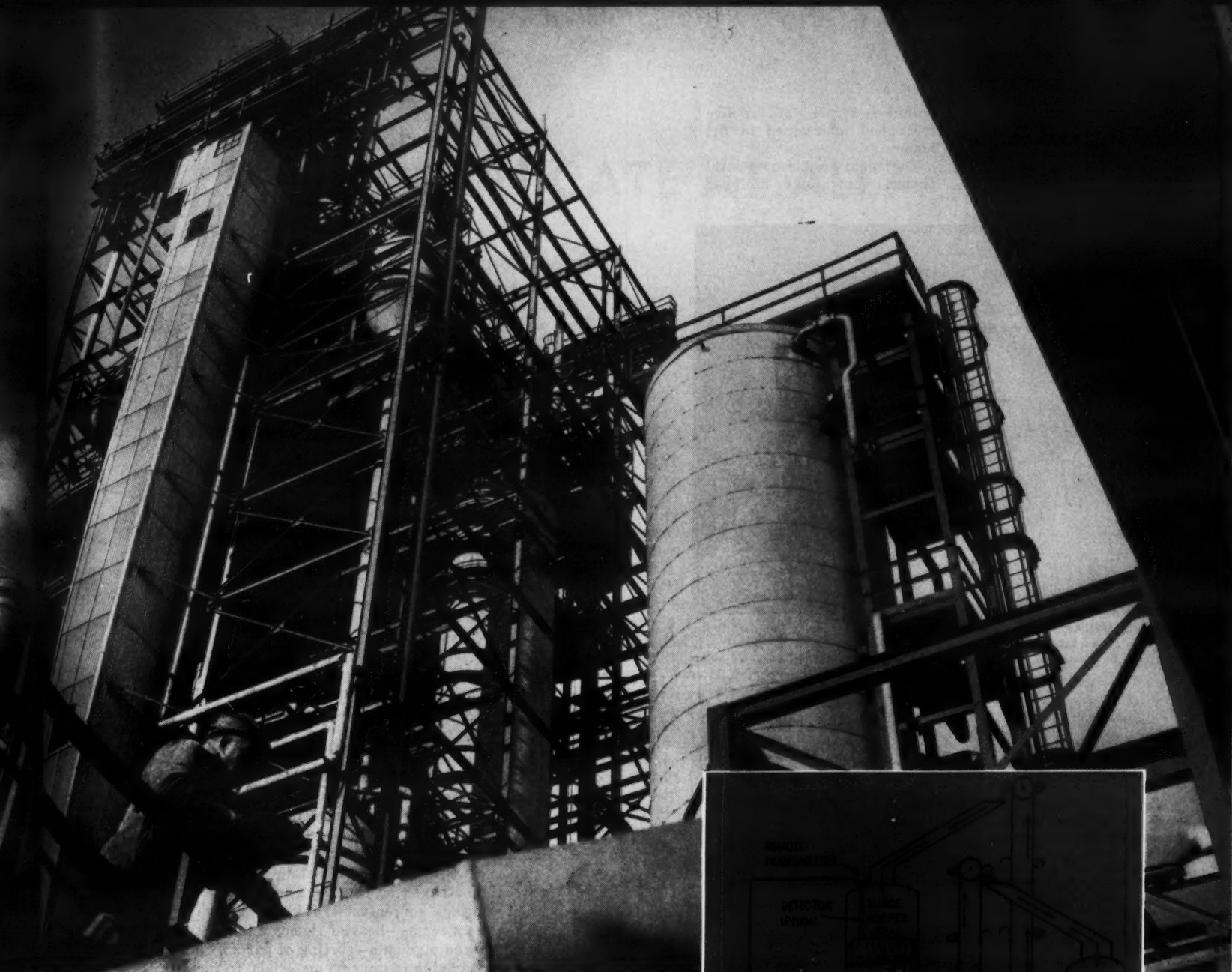
not critical.)

The small, compact transmitter unit is simple in design, contains no moving parts or vacuum tubes, and requires no power. This unit is potted in a moisture-proof resin to make a rugged package that can be quickly replaced if need be.

To page 32

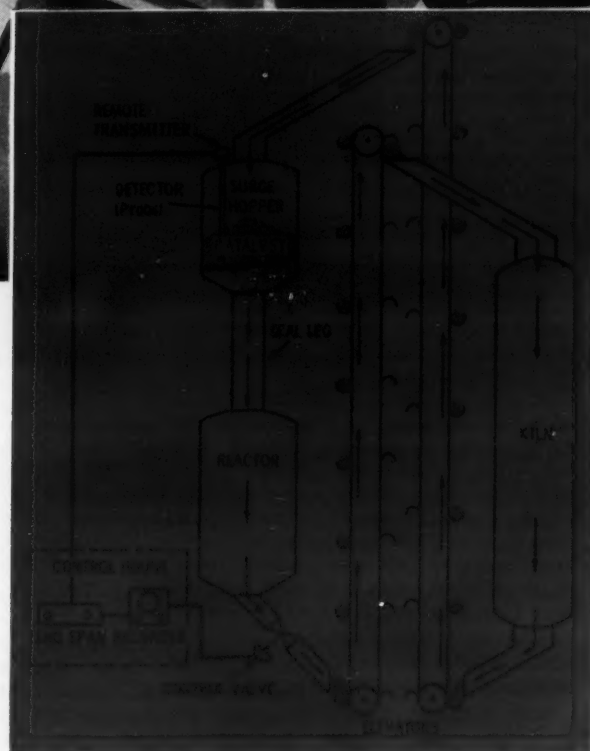






Increased throughput in Thermoform catalytic cracking units at Sun Oil's Marcus Hook Refinery was dependent on development of catalyst level regulator that was highly accurate and dependable

Schematic diagram show how capacitance-type catalyst level controller works in Sun Oil's elevator-type Thermoform catalytic cracking unit at Marcus Hook refinery



## Electronic Level Controller — From page 31

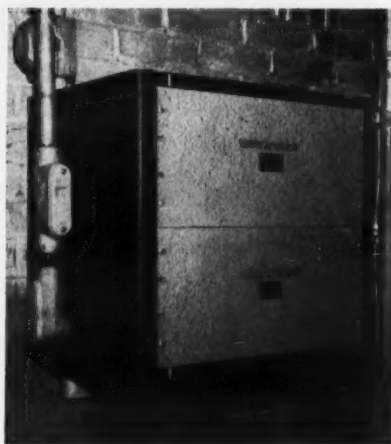
The electronic components are mounted on a swing-out chassis for ease of accessibility. Entire chassis can be removed from hinge and re-

within  $\pm 1$  inch, at the five foot level maintained in the hopper.

The rapid response to level change contributes to good



Remote transmitting unit is located on top of catalyst surge hopper. Probe goes down inside catalyst bed to serve as insulated plate of a condenser. Side of vessel is the grounded plate, and catalyst serves as dielectric. Sensitive measurement of capacitance activates the control



Behind the instrument panel and over 300 feet away, electronic unit senses capacitance of transmitting unit, activates a recorder-controller. Other than for tube replacement, unit has needed no maintenance for over three years

placed in a few minutes.

Output of electronic unit is connected to a conventional recorder-controller where level is to be controlled, or to a recorder or meter for level indication. Zero and span can be set in the control room.

**Results:** The first capacity level control unit has been in operation over three years. A second unit has been installed more recently. These units hold the catalyst level

operation by maintaining a uniform catalyst flow rate. Since there are no moving parts the capacity probes require little maintenance. Thus far, no service has been required, other than routine tube replacement in the electronic unit.

(Additional technical details are available from Applied Physics Section, Sun Oil Company, Philadelphia 3, Pa.) Check 4395 opposite last page.

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**monitors  
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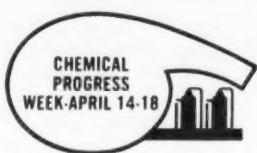
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CHEMICAL PROCESSING

# WHY COMMUNICATE AT ALL?

## DR. ERNEST HART

President, Food Machinery  
and Chemical Corporation  
and Chairman of the Board,  
Manufacturing Chemists' Assn., Inc.



**I**F you told the average 19th century industrial baron that he should write articles, make speeches, inform the press and the public about what he was doing and why he was doing it, he'd probably have had you thrown out the gate, or at best had you gently led away. "I'm in business to make a product and sell it at a profit and that's all," he'd say.

Today's manufacturing organization has the same basic purpose, of course. It is in business to make a product and to sell that product at a profit. Today, however, management knows that this simple philosophy is not enough.

We have learned that a corporation or an industry has a personality. It has a public posture. It has a reputation. Whether this reputation is good or bad depends first on how the industry acts — or doesn't act — and then on how well it communicates its reason for acting.

We have learned that, whether we like it or not, because of its very presence a manufacturing plant is part of a community. We know it is better for our plant management men to take their normal role among the leaders in a community than to sit silently behind the plant fences.

By being part of the community in which we live and work, we are discharging our role both as individuals and as representatives of our country. And this, I feel, is an important point. A corporation, like an individual, has citizenship and must meet the obligations of citizenship, and I don't mean just by paying its share of the taxes.

The chemical industry has been, I feel, among the more progressive industries in the field of communications. Perhaps it is because we are a young industry saddled with fewer taboos. Perhaps it is because we have grown so fast. Perhaps because we have pioneered the advent of industry in so many communities throughout our country.

### Year-round Challenge

This year we are pioneering again. Most of you know of, or have participated in, "Chemical Progress Week" which is being observed this month for the fifth consecutive time. As successful as this program has been, re-

ports from all over the country convinced us at the Manufacturing Chemists' Association that a week was not enough — that our industry has a year-round opportunity which could not be discharged in a week's time. We investigated, analyzed, debated, and came up with the Chemical Industry Activity Committees program, a continuing year-round effort conducted at the community level in the fields of education and public relations. "Chemical Progress Week" is an optional part of the new CIAC program.

As you read this, hundreds of chemical industry men and women literally from Maine to California are developing this continuing program in their communities, areas, and states.

We have attempted to so organize the CIAC effort that there will be a place for everyone, from chairman of the board to the newest hourly rated worker.

Basic purpose of the program is to explain the significance and importance of chemistry and the products of chemistry in terms of the daily life of the individual.



COVER STORY

This broad purpose permits many extensions. For instance, this year as a sub-theme we are cooperating with the chapters of the American Institute of Chemical Engineers as that splendid organization marks its 50th Anniversary.

### Schools Program

One facet of the program, perhaps the most rewarding, is the opportunity it affords us to work with teachers and students. I am glad to have the chance to observe here that the chemical industry was among those who were concerned about the shortage of scientists and engineers long before the Sputniks began circling the earth. More than just concerned: Over two years ago we did something about it in the form of an education program beginning at the junior high school level. This year we got a high school program underway. The work we are now doing with thousands of junior and senior high schools throughout our land will interest more young people in science and careers in science. Part of it, a series of "open end" experiments, is aimed at developing the spirit of scientific inquiry — offering a challenge to the young mind.

This work can't reach anything like maximum success if handled solely from MCA's Washington headquarters. There must be year-in, year-out participation at the community level. Remember, just as there are 8000 new mouths to feed at breakfast each morning over the country, every fourth face is a new one in our high schools each September.

*To next page*

**ERNEST HART'S** present positions as president of Food Machinery and Chemical Corporation, and as chairman of the board of the Manufacturing Chemists' Association, represent a long career of activity and interest in chemical manufacturing.

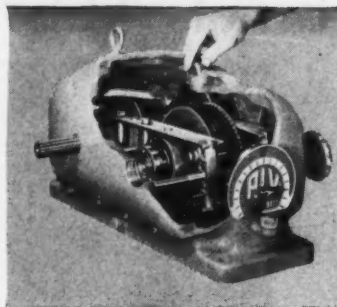
Dr. Hart's career in agricultural chemistry began in 1914 as organizer of the technical department for Niagara Sprayer and Chemical Co. He was in charge of sales and research until Niagara was acquired by FMC in 1943. During his many years as sales manager, he organized a national distribution system for agricultural chemicals. His activity in this field includes a period as president of the National Agricultural Chemical Association. In 1956, Dr. Hart was elected president of FMC.



# How Link-Belt P.I.V. provides stepless speed control

By employing a positive chain drive to transmit power, Link-Belt's P.I.V. (Positive, Infinitely Variable) variable speed drive provides instant and positive speed settings, with no perceptible loss of speed regardless of load. Stepless variation of any speed from maximum to minimum can be obtained instantly, even while operating at full load.

The chain which forms the "heart" of P.I.V. is a self tooth-forming chain consisting of a series of overlapping steel laminations which serve as teeth and are free to move from side to side, singly or collectively (see below). This ingenious chain fits into radially grooved wheels (see below) which have teeth cut at a constant depth but of increasing width toward wheel periphery.

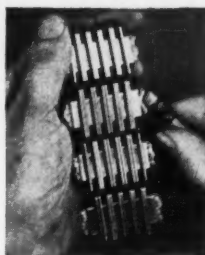


P.I.V.'s are compact, permitting installation as either a separate unit or as a built-in part of the driven machinery. Exceptional application flexibility can be accomplished by

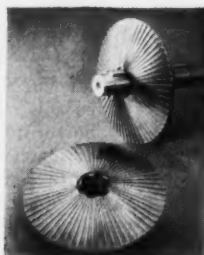
incorporating both motor and helical gear sets integrally with the P.I.V. drive.

By means of pneumatic, electronic, hydraulic or mechanical controls, P.I.V.'s can be used to synchronize machine components or complete machines with a precision matched by no other method. Whether these processes involve tension, volume, synchronization, winding speeds, moisture content, product thickness or similar requirements, these controls sense variations quickly and compensate for change through the P.I.V. before product quality is affected.

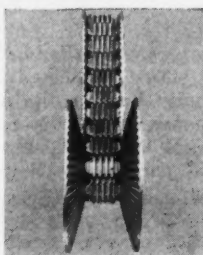
These unique P.I.V. drives are built in a wide range of sizes and assembly types, in capacities from 1/2 to 25 h.p.



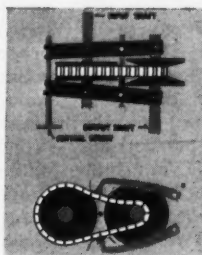
Self tooth-forming chain consists of overlapping steel laminations serving as teeth.



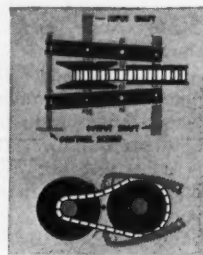
Teeth on radially grooved wheels provide grip for self tooth-forming chain.



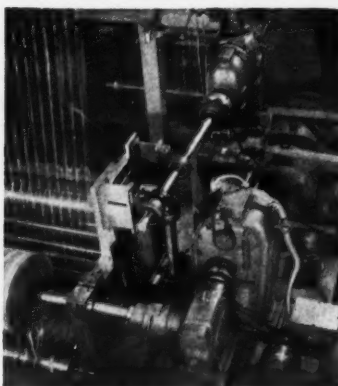
Chain teeth engage wheels to provide a positive chain drive to transmit power.



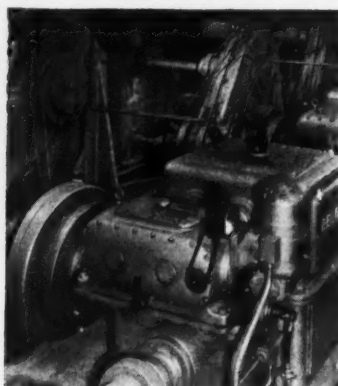
Maximum speed setting of the grooved wheels produces high speed at output shaft.



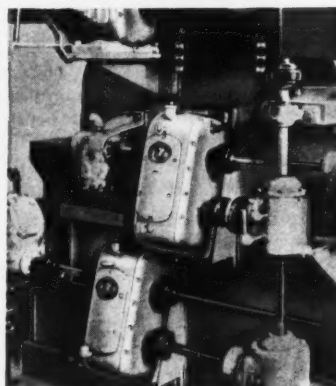
Minimum speed setting of the grooved wheels produces low speed at P.I.V. output shaft.



**PRINTING**—P.I.V.'s on windup and dryer rolls prevent tension build-up on press running cellophane sheet.



**PAPER MAKING**—P.I.V. with remote control lets operator control draw on differential drive paper machine.



**TEXTILES**—P.I.V.'s on rayon spinning machine control thread denier and speed of viscose metering pumps.

From page 33

The critic, busy producing his product and fighting for his share of the market in one of America's most competitive industries, might say, "Great, but it costs time and it costs money. What do we get out of it?"

For one thing, our work with schools will inevitably increase the number of students who go on to careers in the sciences. Others, challenged in early youth, will turn to more technical careers than they might otherwise have done. Our industry and all industry will need many thousands more of this kind of trained person in the years to come. If they aren't trained today they simply won't be available tomorrow.

## Changing Public Attitudes

Today the chemical industry is confronted with a number of public attitudes that need dispelling. For example, chemical plants are sometimes considered hazardous in the public mind. Every accident we do have makes page one, helping to reinforce this concept.

As most of you know, we are among the safest of industries in which to work. Constant stress on this through such media as speeches, plant



"... Well, never mind  
... just get out there  
and sell chemicals."

**BOOKS 2274 and 2349** describe P.I.V. drives and controls, respectively. Get your copies from your nearby Link-Belt office or authorized stock-carrying distributor.

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Check 4397 opposite last page

tours, and publication of safety data showing that a man is safer on the job than at home, is the only way to dispel this unfavorable and erroneous opinion.

There are other unfavorable opinions that we have to work on continually: that we aren't a good neighbor because we might blow up or, at best, pollute the skies and streams; that we make more money than we really do and could probably do with additional federal regulation; that the "synthetics" we make aren't as good as "natural" products; that although we are important in time of war we could be done without during peacetime.

These unfortunate stereotypes exist partially because, until quite recently, virtually none of our products went from us directly to a consumer, as is the case with an automobile or a TV set. After all, there are very few purchasers of carboys of sulfuric acid or carloads of caustic soda.

In order to establish a favorable opinion we must explain what all the boiling, mixing, and stirring we do means to the individual. Otherwise, why should he want to come to work with us, buy stock in our companies, or support our view when we need or want public support?

#### Much to Give, Gain

The Board of Directors of the MCA, which serves as the national sponsoring committee for the Chemical Industry Activity Committee program, feels that we, as an industry and as individuals, have much to give and much to gain.

These, then, are my views on why we should communicate.

If you agree with me I would like to extend an invitation to all companies, whether members of the MCA or not. If you feel you are part of the chemical industry and would like to join the CIAC program, write to us in care of the Public Relations Department, Manufacturing Chemists' Association, Inc., 1625 Eye Street, Northwest, Washington 6, D. C. We will welcome your inquiry and will be pleased to tell you the ways in which you can co-operate in this new program.

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**45-S GRANULAR**

**NEW FLAKE**

**3 forms — for any need . . .**

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**2. Regular Granular Form**—Fast dissolving, crystalline material for a wide range of applications.

**3. 45-S Granular Form**—Similar to regular granular form, but preferable when greater resistance to caking in storage is desired.

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Chloride • Methylene Chloride • Cleaning Compounds  
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SOLVAY branch offices and dealers are located in major centers from coast to coast.



Check 4398 opposite last page

Through the "Inve-trol" system, customers of the Elkhart Paint Mfg. Co. have been able to reduce their paint inventories by as much as 400 percent. Unlabeled cans represent normal inventory of pre-mixed paint colors bought at price discount by user who needs variety of colors in small quantities. Smaller group of containers represents same color selection (at same discount) using "Inve-trol" system



## Polyester pouch solves paint marketing puzzle

Pigments in heat-sealable polyester pouches and base white enamel in 6-gallon cans help an Indiana paint manufacturer's customers to reduce inventories by as much as 400%

**W**ITH the present trend of maintaining minimum inventories, industrial customers of an Indiana paint manufacturer have welcomed perfection of a marketing system which gives the user a selection of more than 20,000 colors and shades and yet allows him to reduce his paint inventory.

Under the "Inve-trol" color kit system developed by the Elkhart Paint Manufacturing Co. (Elpaco), Elkhart, Ind., customers have been able to reduce inventories by as much as 400 percent. Some have reported that the inventory reduction has also greatly reduced any fire hazards that may result from storing large amounts of partially used lots of colored paint.

System became a realization through introduction of a heat-sealable polyester film in which paint colorants are packaged separately from base white enamel. Under the system, a

customer empties coloring pigments from plastic film pouch into enamel and stirs about as long as it takes to prepare a container of pre-mixed paint.

He maintains in stock only enough base white to meet his forecasted paint consumption over a short period, and mixes his colors from color kits as they are needed. He is never caught with a stock of "dead" colors when customers change color orders.

The "Inve-trol" system grew out of the needs of an industry using a large selection of paint colors in small quantities. Where a color is specified that is not in stock, the paint must be ordered in less-than-100-gallon lots at a premium price. Normally, paint is ordered in 100-gallon minimums to take advantage of price discounts.

Consequently, the customer may not use up all of the 100-gallon lot of a specified color

within a reasonable period. He then would have the rest of the lot on inventory until it is used up. Under the color kit system, he can realize discounts by ordering 100-gallon lots of base white and the corresponding number of pouches to make up the various colors to meet immediate demands.

The idea of separate containers for pigment and base is not new, but it is the first time that it has been tried on an industrial basis. It is the first time plastic film has been used in this way.

The "Inve-trol" system was two years in reaching the market primarily because a true color is dependent on a virtually complete emptying of the pigment containers. Cans and tubes are difficult to empty completely. Tubes cannot be examined visually to check the amount of colorant left.

Rigid plastic containers and plastic films were tried with the

same lack of success. Solvents in the colorant either dissolved the film or permeated it after a very short time. Other films didn't have sufficient heat-seal seam strength.

Use of a plastic film bag or pouch was the only answer to emptying problem. Pigments could either be pressed or rolled out, and the workmen could check each bag to assure that it was empty.

At a packaging show in the summer of 1956, William E. Miller, Elpaco's president, ran across a heat-sealable polyester film making its debut. After several tests, Elpaco decided it was the answer to its packaging puzzle.

Once the decision had been made to use the polyester film, Miller and his assistant had to work out:

- the standard quantity of base paint for each single mix
- the range of pouch sizes that would give the widest





In same amount of time needed to prepare pre-mixed paints, customer can obtain desired color and shade



Paint is mixed in six-gal container holding five gal of white. This leaves enough space in container for clean mixing with air-mixer



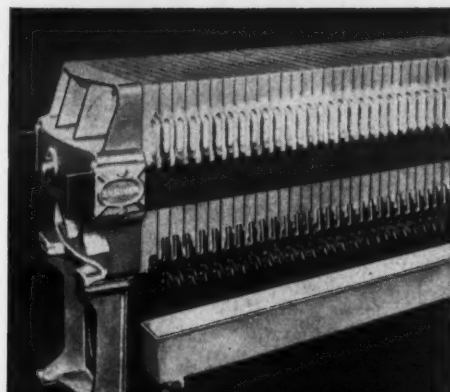
Remaining pigment is forced from pouch with squeegee. Only a minute amount of colorant remains in pouch. Very close color-matching is possible

selection of colors and shades.

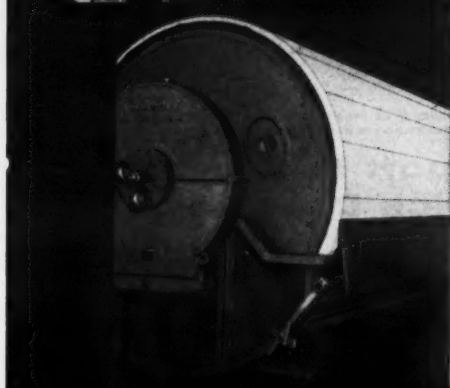
Since a five-gallon container is the standard bulk size, it was decided to continue using five gallons as the amount for any single mix. Each five gallons would be placed in a six-gallon drum to allow room for the added colorants and for the usual sloshing which occurs in mixing.

After many experiments, five different pouch sizes for each single colorant were chosen to give a working range from 2 to 32 ounces. Thus, if a customer wants a slightly stronger blue than a

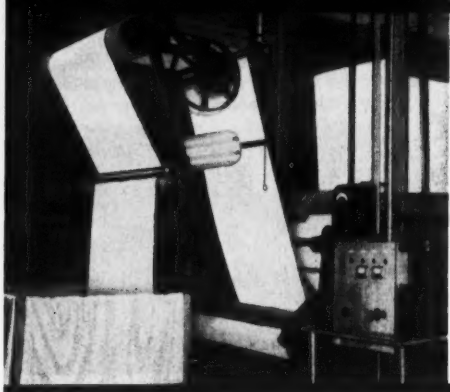
## FILTER FABRIC QUIZ



1. Of course you recognize this as a recessed-plate pressure filter. In such filters, where intervening frames are not present, is it true or false that filter cloths must have exceptionally high flex and abrasion resistance?



2. A cotton filter fabric is at work. Which of these is *not* characteristic of untreated cotton fabric: (a) very high wet strength; (b) surface slickness; (c) natural twist for spinning strong yarns.



3. Can you tell what's going on here in the textile finishing plant? Hints: the fabric is nylon, and the process is concerned with dimensional stability.

Here are a few more questions to test your knowledge of some basic filter fabric facts. Even if you score 100, we think you'll find it helpful to remember that you, as a processing engineer, don't have to know all the answers about filter fabrics. That's what we're here for. Wellington Sears people and the filter specialists who distribute our fabrics are always ready to lend a hand in solving your filter cloth problems. And for a handy book of information, write Dept. M-4 for "Filter Fabric Facts."

For answers, turn page upside down

g. heat setting

(b) 2.

ent. 1.



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Check 4399 opposite last page

# BRIDGEPORT BRASS

## COPPER ALLOY BULLETIN

CONDENSER AND HEAT EXCHANGER TUBE EDITION

### Advantages of Duplex Tube

by C. L. BULOW  
Chief Corrosion Metallurgist  
Bridgeport Brass Company



Bridgeport Duplex Tubes are used where a heat exchanger tube is attacked simultaneously inside and out by different types of corrosive media. Duplex is made by drawing two tubes of different metals, one over the other, and combining them into a single tube.

#### Metal Combinations

This type of construction permits the use of a wide range of combinations of metals—Admiralty, Cupro Nickel, Copper, Aluminum Brass, and many others coupled with steel, nickel, aluminum, stainless steel, Monel, etc.

#### Many Uses

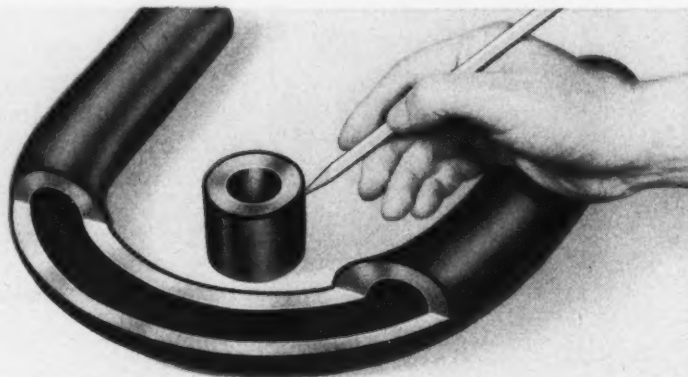
Applications for Bridgeport Duplex Tubes include successful service in the production of ammonia, benzol, hydrocarbons, resins, rubber chemicals, carbon dioxide and many other chemicals. Likewise, duplex tubes are admirably suited for replacement of ordinary boiler tubes for use in air-compressor aftercoolers, lube-oil coolers and fuel-oil heaters.

#### Applying Duplex Tubes

It is virtually impossible to prescribe what duplex tube combination is best for any specific use without information on the specific requirements of the application. The important point to remember is that with duplex tubes you can practically "tailor" the tube to your requirements.

#### Laminated Tube Sheets—Another Weapon in The Fight Against Dual Corrosion

Bridgeport now offers metallurgically bonded dual-metal tube sheets especially designed to combat dual corrosion. These tube sheets are a valuable adjunct to duplex and copper and copper-alloy condenser and heat exchanger tubes. They are available in a number of combinations such as Naval Brass, Muntz Metal, silicon bronze, copper, and Monel with steel and stainless steel.



Heavy-wall duplex consists of a thin wall of copper or other nonferrous metal around a thick-walled steel tube—a perfect combination for high pressures and utmost corrosion resistance.

### New Bridgeport Heavy-Wall Duplex Tubes Lick Dual Corrosion Problems at High Pressures

High-pressure heat exchanger operation presents two very basic problems. The first is to find a tube thick enough to stand up under the pressures used. The second is to find a tube material able to withstand corrosive attack for long periods of time and at the same time provide desired heat-transfer characteristics.

#### New Heavy-Wall Duplex

Bridgeport came up with the answer in a new design—heavy-wall duplex tube. Heavy-wall duplex consists of a heavy inner tube with an outside covering of thin-wall nonferrous tubing. Although the inner tube is low carbon or stainless steel, and the outer tube Cupro Nickel, Red Brass, Admiralty or copper, both inner and outer tube materials can be varied to suit the conditions of the application.

#### Advantages

Use of a nonferrous outer tube cuts corrosive effects of cooling water. And, because it resists corrosion, it gives the entire tube installation superior heat-transfer characteristics. With proper cleaning and maintenance, a Bridgeport Heavy-Wall Duplex Tube will substantially outperform single metal tubes.

#### Installation

Most applications are in cascade coolers where bent tube ends are required. Small sections of heavy-wall

duplex can be formed to the desired radius or one end of long sections can be bent, thereby eliminating one weld joint.

Heavy-wall duplex tubes are designed to the ASME Code to operate at pressures up to 5,000 psi. They will, however, pass hydrostatic tests at much higher pressures. In actual operation they will give years of satisfactory trouble-free service with no more than normal cleaning and maintenance procedures.



To make hairpin turns, sections of heavy-wall duplex are bent and welded to straight lengths or other bent sections.

#### Further Information

More detailed information on sizes, characteristics and ratings of Bridgeport Heavy-Wall Duplex Tubes will be furnished on request. Our Technical Service representatives are also available to cooperate with you in working out application problems. For prompt service, call your nearest Bridgeport Sales Office.

16-ounce pouch in five gallons of white will give, he can add either a two- or four-ounce pouch until desired tint is reached. Color combinations are almost endless.

The film manufacturer solved the labeling problem. By using tape labels to show brand name, content measure, and order code, labeling costs are kept low, and low film inventories are maintained. The pouches could be printed, but that would mean building a large inventory of printed film rolls. The tape is perforated so that it can be removed from the rolls as needed.

Once the "Inve-trol" kit was worked out, it was offered in an eight-basic-color selection. The number was later increased to 12, and includes several metallic colors which are becoming more popular.

With the wide color selection, an "Inve-trol" user may select a shade from a sample book and, from the code printed on the back of each color, call in an order. And if the color isn't on the chart, it can be matched by calling for a shade between two colors on the chart.

At present, only Elpaco's quick-drying enamel is available in the color kit system. But President Miller, buoyed by its quick success in the industrial field, is looking seriously to expanding to include the other types of paint sold by his firm.

("Scotchpak" heat-sealable polyester film and "Scotch" brand tape labels are manufactured by Minnesota Mining and Manufacturing Co., 900 Bush St., St. Paul 6, Minn.)

Check 4401 opposite last page.



### BRIDGEPORT BRASS

Bridgeport Brass Company, Bridgeport 2, Connecticut • Offices in Principal Cities  
In Canada: Noranda Copper and Brass Limited, Montreal

Check 4400 opposite last page

CHEMICAL PROCESSING

David S. Moffitt is vice president of The Connecticut Hard Rubber Company. An alumnus of Yale University and Dartmouth's Graduate School of Credit and Financial Management, he is a member of the American Management Association's Finance Division Planning Council. At Connecticut Hard Rubber Company, Mr. Moffitt has held many posts throughout the organization and has been vice president since 1955. He received the National Association of Cost Accountants' Lybrand Award in 1952.



IN the past year or so there have been a number of suggestions made on how corporate income taxes could be reduced. There is a bill now before Congress, which calls for regular decrease in over-all tax rates over a five year period. There is also a suggestion put forth in favor of small business to reverse normal and surtax rates. The normal tax rate is now 30% on all profits; the surtax is 22% on profits in excess of \$25,000 per year. The reversal in effect would reduce the taxes paid by small businesses and by those corporations with low incomes.

Both of these tax reduction plans seem to me to have two faults in common. Both would reduce the Government's income from corporate income tax at a time when it appears expenditures for national security are on the increase because of the race in technical weapons development. Neither plan offers any real stimulus to the economy above and beyond the actual

amount of tax reduction. The bill favoring small business would actually aid larger firms whose lack of efficiency has depressed their earnings.

On the other hand, a tax reduction plan which would exclude from a corporation's taxable income that portion of its earnings in excess of those for any previous year would seem to have some merit. The effect on government income would be to delay by only one year collection of tax on the increase. First, only the increased part of record earnings would be exempt from tax—as the bar chart shows. The tax base moves up each year that record profits are earned. Second, this plan would provide a stimulus for real growth. The increased productivity would be a real stimulus to the country's economy.

For companies in growth industries this plan would be a great aid in providing additional capital for continued growth. A firm earning 25% before taxes

on its employed assets (a figure not uncommon in the chemical industry) could expand at a rate of 13½% per year under this plan if it reinvested all its profits, compared to 12% under the existing tax structure. This would mean that such a firm could approximately double in size every five years instead of six. Since growth industries provide the impetus to our economy and since many firms in growing fields have found it difficult to finance their growth, the suggested tax plan would seem to be very worthwhile.

The benefits of this plan would not be limited to growing concerns. Any business man is interested in tax-free profits. For well-managed medium- and large-size firms, this tax plan would be a spur to increase productivity, particularly in the service areas as distribution, in which productivity increases have not been as easily attained as in manufacturing. This increase in efficiency should offset the squeeze on profits and combat inflationary pressures brought about by contractually guaranteed annual wage increases.

Increases in efficiency are not the only way to increase productivity. Decreases in waste will accomplish the same thing. The proposed tax reduction plan should bring about an elimination of wasteful expenditures undertaken only because of the high tax rates. I am thinking here of exorbitant entertainment expenses and lush fringe benefits for officers which, having no productive value whatsoever, would be eliminated if the increased profits were tax-free.

The benefits of this tax plan would not be available to all corporations as would be the benefits of the bill now before Congress. Nor would benefits be available only to special interest groups as in the small business proposal. On the other hand, this plan will reward the efficient. From that reward the whole economy should grow and prosper.

There have been questions as to administration problems caused by such a tax plan. It seems to me that some controversial tax points that cause trouble now might be cleared up. For instance, a business man could be allowed to set his own depreciation rate. If he set it too high, he would lose out on the opportunity to get tax-free prof-

# A NEW TAX PLAN TO ENCOURAGE EFFICIENCY & GROWTH

DAVID S. MOFFITT

Vice President

The Connecticut Hard Rubber Co.

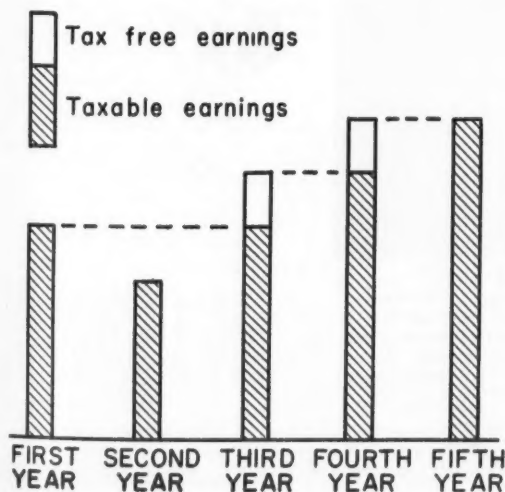


Chart of the effect on earnings, both taxable and tax-free, over a five year period. Only the increment over a previous year is tax-free, according to the proposed tax plan concerning earnings needed for company growth

## WHAT'S YOUR REACTION???

Do you think Mr. Moffitt's idea has merit? If so, we would like to hear your reaction. Even if you disagree with him, we are interested in your opinion. Write the Editors of CHEMICAL PROCESSING.

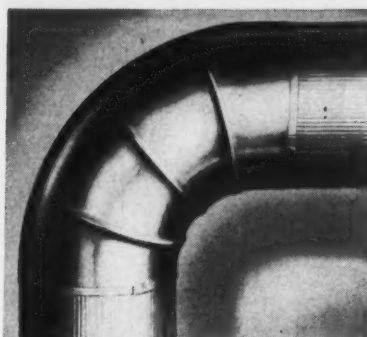




**9:00 A.M.** Workman places two halves of Ell-Jac over insulated elbow. Halves of Ell-Jac are held in place with wire while holes are drilled for sheet metal screws.



**9:04 A.M.** Screws are quickly inserted to hold Ell-Jac snugly and permanently in place. Childers Aluminum Ell-Jacs come in 60 standard sizes for both 90° and 45° long radius elbows.



**9:06 A.M.** Ell-Jac completely installed. When straight line aluminum weather-proof jacketing is added, lines have complete, maintenance-free protection for all costly insulation.

## How New Childers Ell-Jacs Save You Time and Money

**Revolutionary new Childers Ell-Jacs go on fast and easy . . . fit perfectly . . . cut installation costs . . . never need painting . . . and, used with Childers Jacketing, give your insulated lines that well-dressed look from end to end.**

**Now, aluminum elbows** are made in a wide range of sizes by America's leading manufacturer of aluminum jacketing. Childers Aluminum Ell-Jacs are available for quick, easy application to protect costly elbow insulation.

**Childers Ell-Jacs are two-piece**, deep drawn from .020" aluminum, #3003 alloy. They are precision-formed for long-radius elbows and come in 60 sizes for both 90° and 45° ells.

**Childers Ell-Jacs**, together with Childers Jacketing, now let you install maintenance-free aluminum over every square foot of your valuable insulation. You protect *all* of your insulation investment at lowest cost. You get the bonus of a better looking plant and easier housekeeping.

**Positive weather-proofing** with Childers Jacketing is assured by exclusive Childers Lap-Seal (Patents Pending). You're sure of getting proper lap without waste. You save labor, too.

**Factory attached moisture barrier** protects both Childers Jacketing and Childers Ell-Jacs against corrosion that could otherwise damage the underneath side of the aluminum. Its slight extra cost is more than offset by savings in application labor.

**You also get greater strength** and greater protection because Childers Jacketing is cross-cripped. Cross-

crimping increases the vertical strength and rigidity of a .016" sheet to that of a plain .024" sheet.

**It's easy to install** Childers Jacketing. All you need are pliers and screw-driver, plus inexpensive strapping. Two men can do the job. Jacketing can be removed for inspection of the lines, then reapplied without waste.

**First cost is less** for Childers Jacketing than for any other permanent type weatherproofing—even less than some temporary coverings.

**You end maintenance worries**, too, by using Childers Aluminum Weather-proof Jacketing and Ell-Jacs. Aluminum *keeps* its new look; needs no expensive periodic repainting.

**Why not benefit from Childers** world-wide experience when you buy insulation for your lines, towers, vessels, and tanks? More than 2,000 petroleum refining, petro-chemical, and chemical plants will endorse your decision. Childers Engineering Representatives, located in 27 major industrial centers, give professional advice on insulation jacketing.

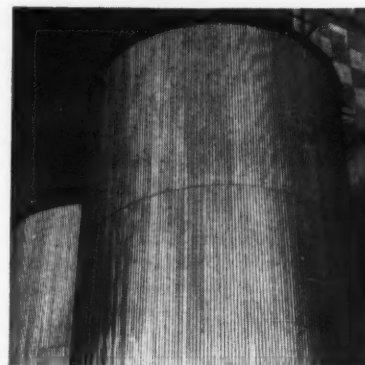
**For a free sample** of Childers Aluminum Weather-Proof Jacketing, with engineering data on how to safeguard your insulation, write Childers Manufacturing Company, Dept. CP-16, P. O. Box 7467, Houston 8, Texas.

In Canada, write direct to Peerless Mfg. Co., Sub-Post Office 28, Calgary, Alberta.

Only Childers makes available to you complete specifications and engineering data on aluminum jacketing in these catalogs: Sweet's Industrial Construction File pp. 6b/Ch; Chemical Engineering Catalog pp. 530a-d; Refinery Catalog pp. 341-4.



**EXCLUSIVE LAP-SEAL**, available at no extra cost, is a series of 8 ribs rolled into the underlapping edge of the jacketing, providing an automatic measure of the 2" circumferential lap. Proper lap is assured without waste. Labor is saved. Where desired, a positive weather seal is easily made with Lap-Seal and a mastic.



**DEEP CORRUGATED** Childers Jacketing in 1 1/4" and 2 1/2" corrugations is recommended for permanent protection and improved appearance of insulated towers, vessels, tanks. Deep Corrugated Jacketing with factory-attached moisture barrier is another product available only from Childers.

its from growth. If he set it too low, his profits would be greater but so would the time taken to depreciate the property. In either case, the Treasury would collect about the same amount of taxes because of the tax-free feature on growth profits. The same line of thought could be applied to all the other categories of expenses over which executives and tax collectors have been wrangling for many years. This list includes capitalizing or expensing minor repairs and equipment, salaries of owner-officers, travel and entertainment, patent expense, and many others. As long as a consistent accounting method is used, the government will collect about the same regardless of how these items are handled.

Mergers and spin-offs, too, appear to present little problem. With mergers pre-tax profits are just combined year by year to find the year with the highest profit above which the merged unit's profits must rise to get any tax-free income. With spin-offs the profits of the spun-off unit can be arbitrarily determined according to the valuation formula used in determining the worth of the separated enterprise. ■

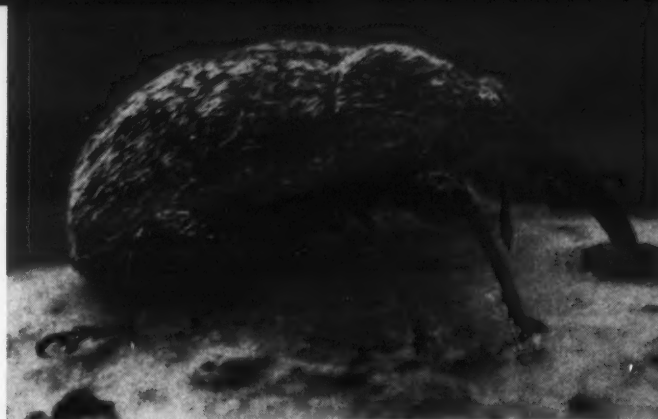


"You say a full color annual report would cost 'plenty of moolah'—can you be a little more definite?"

Check 4402 opposite last page

In an article in November 1957 **CHEMICAL PROCESSING**, our chemical industry was challenged to cooperate with entomologists in studying all phases of controlling insects: Studying not only the effect of poisons, but also cultural and application practices, biological and selective control, modes of insecticide action, and insect resistance mechanisms.

This report tells how an insecticide manufacturer has met this challenge — has come up with a successful **METHOD** of control, which **KEEPS** his insecticide effective.



USDA Photos

Adult boll weevil. Actual size of adult and their larva is about 1/4 inch

## technical service + proper programming = successful insect control

In the last few years, estimated annual loss of US cotton from insect damage has been a hefty 14% of our \$2½-billion crop.

The problem has become acute in certain cotton-growing areas of the country because of a seeming build-up of resistance to insecticides by the boll weevil, the major offender.

In fact, one laboratory test showed that certain boll weevils had become so resistant to a certain insecticide that mature weevils were not poisoned when this insecticide was actually poured on the insects.

Hercules Powder Company's Agricultural Chemicals Division had been conducting continuing experiments on their chlorinated insecticide, toxaphene. They also had access to results of work done by various state and federal experiment stations.

These studies made them conclude that one of the most important factors in weevil control was correct *programming* of the applications, and that their product properly used was working, even in "resistant" areas.

To prove that this was true, Hercules undertook a major experiment starting in the spring of 1957. A total of 1,750 acres on nine farms scattered throughout the "resistant areas" of Louisiana were chosen.

The two important requirements were that the farmers were to follow to the letter all

recommendations of the Hercules group, no matter how different they might sound, and second, that the farmers had conventional insecticide-spraying equipment in good condition.

### The Program

Here's what the farmers were told to do that was different than their previous "standard" methods. It had been standard practice to wait until early July to start control spraying. This was the point at which 95% of the anticipated brood of weevils had already emerged and had started to reproduce.

On the other hand, farmers on the Hercules program were asked to spray their cotton as soon as it came to a stand. This was in May. Spraying toxaphene about five times on a weekly schedule controlled thrips, and other insects which destroy the early buds (squares) of cotton, and kept the boll weevil from getting well established in the fields.

This allowed the plants to make fast early growth, and to fruit and thus mature earlier. Early maturing cotton not only escapes the large build-up of pests later in the season, but also is of better quality and thus brings a better price.

To take care of the remaining boll weevils later in the season, thirteen or fourteen applications of toxaphene-DDT (2:1 by wt)

were started in mid-July. This was at four to five day intervals until the cotton was mature and needed no more protection.

And how did it work out?

One of the farmers said, "I liked the toxaphene and toxaphene-DDT program because it cost me about \$10 to \$15 an acre less than the insect control program that I used on other cotton. The 146 acres in the toxaphene program matured earlier than any of the other cotton."

Another example of the success of this program was one of the experimental tracts near Cheneyville, Louisiana. The farmer has 100 acres in cotton, and by mid-September had picked 50 bales. In the entire community at that time, only 100 bales had been ginned.

This early cotton was of a better grade than later cotton that he picked. The next 40 bales were of middling cotton. Then the rains started, and the grade went to low middling. This meant a \$40 a bale difference.

The farmer attributed the early cotton to the insect control program. He said it was the earliest crop he has ever made, and it would have been larger except for damage done by Hurricane Audrey in late June 1957.

These two examples are typical of the success found on all nine of the experimental areas. The averages for the entire 1,750 acres were 18.6 applications costing \$19.23 per acre for the entire



Cross-section of a damaged cotton boll shows boll weevil pupa and larva

season. Thirty to forty dollars per acre cost of the "standard" program has not been unusual this year.

Hercules doesn't feel they have buried "resistance." They had no idea of doing that. They feel they have shown, however, what their product will do when properly used.

The results? — Many more entomologists are looking into questions of *programming* when faced with poor control results. There is an increased emphasis on the early season control program on the part of those states (seven out of the ten in the boll weevil belt) who recommend this program. Confidence of many farmers has been renewed in the standard insecticide products, and there is a continued confidence on Hercules' part in the future of their product, toxaphene.

# Integrated Product Distribution.....

*challenging concept for cost reduction in material handling and packaging*

R. W. PUDEK

Group Supervisor  
Materials Handling & Packaging Group  
Engineering Department  
E. I. du Pont de Nemours & Co., Inc.

**E**NGINEERING a material handling and packaging function in production and distribution operations is one of the most profitable and most challenging opportunities available to management. It is profitable because it affords a means for increasing productivity of our facilities and for lowering costs. It is challenging because ingenuity is required to develop the systems and equipment to satisfy the complexities of today's product distribution operations.

In the past, industry has devoted most of its engineering work to production operations. We can no longer afford this limitation of engineering effort. Today's needs demand a comprehensive "systems approach" to material handling and packaging. This concept requires consideration of many and varied factors — warehousing, transportation, data handling systems, and customer needs.

We call the application of engineering to all of these operations "Integrated Product Distribution" — or more simply, IPD. In the engineering sense we define IPD as the integration of all the operations required to move a product from the last process in a supplier's plant to the first process in a customer's plant.

This includes packaging, storing, handling, shipping, and transporting operations; the in-transit warehousing, and any further transporting required; and the receiving, storing, and

handling operations involved in moving the material to the customer's point of use. The IPD concept applies equally to incoming raw materials, in-process materials, and outgoing finished products.

Integrated Product Distribution may be represented by the symbol (see drawing, next page) which shows each segment and its relationship to the overall system. No segment can be considered separately because a small change in any one may set off a chain reaction in others. What seems to be a minor improvement in one facet may prove to be a major disadvantage in the operation of the system. Here are some of the segments viewed in their relationship to the entire system.

## Material Handling

Material handling in an integrated product distribution system must be prepared to consider the entire range of packaging from 50-lb multiwall bags to 10,000-lb returnable bulk containers, or even bulk movements in hopper or tank cars. This wide range of available packages creates the problem of selecting appropriate material handling equipment.

Handling equipment must be considered at the supplier's plant; intermediate handling points, such as warehouses, and at the customer's plant. In some cases, it may be necessary to assist the customer in the design, selection, and layout of his han-

dling equipment in order to develop the economic justification for improved facilities.

## Packaging

Selection of the conventional multiwall bag, steel drum, corrugated fiberboard box, or fiber drum is common practice. These containers have been proven through years of use. But what effect will these packages have on our channels of distribution? A conventional package may seem the most economical when it is considered alone. In a systems analysis however, the conventional design may be the most expensive in storing and shipping operations.

Our customers' requirements have convinced us that *the day of a single package is over*. In many cases, we must have several different containers for each product.

Our systems approach leads to

consideration of such items as bulk containers and unit loads as well as the conventional package forms. Bulk containers now in use include expendable units in a range of 1000 to 2000 pounds, and returnable units in a 2000- to 10,000-pound range. Combining parts or packages into a single assembly suitable for mechanical handling produces a "unit" load, which may be handled at lower cost.

## Warehousing

Warehousing involves the unloading, storage, and reloading for both rail and truck shipments. From the overall standpoint of suppliers' costs, *the optimum is no warehouse at all*.

With speedier communications, transportation, and distribution, the concept of no warehouses may approach reality. Our customer, however, wants to oper-

*To page 45*

Roland W. Puder joined Du Pont in 1951 as a senior engineer. Today he is group supervisor for the material handling and packaging group, engineering those phases of Du Pont's operations.

Holding a BS and MS degree in mechanical engineering from Polytechnic Institute of Brooklyn, Mr. Puder's industrial experience covers work at M. W. Kellogg Co., project engineering with the Texas Co., production work in the Coal Div. of US Steel.

At present, he is quite active in the American Society of Mechanical Engineers, the Material Handling Society, and the Society for Advancement of Management.





## How IPD Works

These are the basic concepts involved in engineering an integrated product distribution system. With these concepts in mind, let us review a typical example which illustrates the systems approach:

A dry, powdered material is currently packaged in multiwall bags for shipment to customers. One customer requested shipment in a returnable bulk container. Since the requested type of container required considerable equipment investment on the part of ourselves and the customer, it was evident that an integrated product distribution study was necessary. It was agreed that the study should include all suitable types of shipping containers in addition to the one requested.

A preliminary survey of the problem developed 22 new systems for consideration. A high-spot evaluation showed that many could be eliminated on the basis of economics, thereby reducing the number for detailed evaluation to four. These included expendable bulk containers, metal and non-rigid returnable bulk containers, and hopper cars, in addition to the present multiwall bag system. The following factors were investigated for each system:

### Investment

- Plant packaging and handling equipment and facilities
- Customer handling and related equipment
- Transportation equipment
- Warehouse allocation

### Working Capital

- Raw material inventory
- Finished product inventory
- Cash on hand

### Operating Costs

- Labor — packaging, handling, and warehousing
- Containers — purchase or lease cost
- Equipment — depreciation
- Repairs — (labor and material)
- Freight — outgoing container with product, and empty container return
- Power
- Direct overhead

The complete study on an IPD basis required:

1. High-spot economic survey
2. Inspection of the customer's facilities
3. Container filling, handling, storing, and discharging tests
4. Test shipments
5. Economic evaluation

Test shipments showed that the product could not be readily unloaded from the non-rigid returnable container. This container system was then eliminated from further consideration.

The economic evaluation is shown in summary form in Tables I and II.

To next page

IPD ("Integrated Product Distribution") symbol shows each segment of evaluation and its relationship to overall system



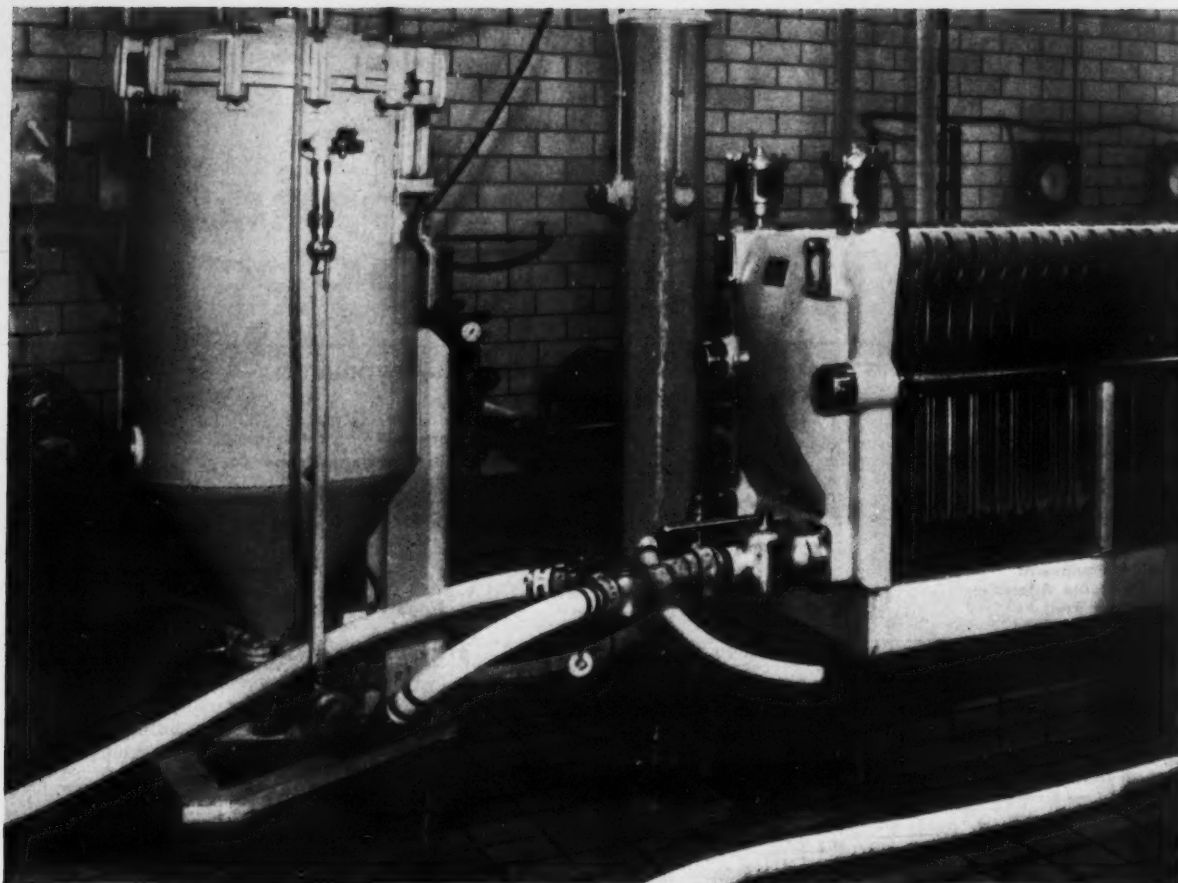
**TABLE I ENGINEERING ANALYSIS OF DISTRIBUTION SYSTEMS — PRODUCT Q  
ECONOMIC EFFECT ON SUPPLIER**

SYSTEM CONTAINER	Present Multiwall Bag	Alternate A Expendable Bulk Container	Alternate B Metal Returnable Bulk Container	Alternate C Hopper Car
Delivery	R R Box Car	R R Box Car	R R Container Car	R R Hopper Car
Net Weight Per Container, lb	50	1500	3000	100,000
INVESTMENT				
Plant Equipment	\$ 6,200	\$ 8,000	\$11,000	\$50,000
Warehouse Allocation	12,000	10,000	—	—
Storage Pad	—	—	1,600	—
Working Capital	6,100	4,600	5,400	3,600
<b>Total</b>	<b>\$24,300</b>	<b>\$22,600</b>	<b>\$18,000</b>	<b>\$53,600</b>
ANNUAL OPERATING COST				
Containers (Purchase)	\$11,500	\$11,000	—	—
Cars & Containers (Rental)	—	—	22,300	12,100
Mat'l. Hdlg. Pkg. & Whse. Labor	13,800	6,600	3,300	1,400
Repairs, Labor & Material	1,200	1,300	1,200	3,500
Depreciation	1,300	1,300	900	3,500
Freight — Finished Product	59,500	61,000	58,000	58,000
<b>Total</b>	<b>\$87,300</b>	<b>\$81,200</b>	<b>\$85,700</b>	<b>\$78,500</b>
COMPARISON-SYSTEMS				
Total Operating Cost	\$87,300	\$81,200	\$85,700	\$78,500
Allowance for 10% Net Return*	4,900	4,500	3,600	10,700
Total Oper. Cost Including Return on Investment Allowance	\$92,200	\$85,700	\$89,300	\$89,200
Order of Merit	4	1	3	2

**TABLE II ENGINEERING ANALYSIS OF DISTRIBUTION SYSTEMS — PRODUCT Q  
ECONOMIC EFFECT ON CUSTOMER**

SYSTEM CONTAINER	Present Multiwall Bag	Alternate A Expendable Bulk Container	Alternate B Metal Returnable Bulk Container	Alternate C Hopper Car
Delivery	R R Box Car	R R Box Car	R R Container Car	R R Hopper Car
Net Weight Per Container, lb	50	1500	3000	100,000
INVESTMENT				
Plant Equipment	\$ 1,000	\$ 3,500	\$10,000	\$40,000
Warehouse Allocation	10,500	10,000	—	—
Storage Pad	—	—	1,000	—
Working Capital	800	2,500	8,300	12,500
<b>Total</b>	<b>\$12,300</b>	<b>\$16,000</b>	<b>\$19,000</b>	<b>\$52,500</b>
ANNUAL OPERATING COST				
Mat'l. Hdlg. & Whse. Labor	\$ 5,400	\$ 3,000	\$ 1,400	\$ 500
Repairs, Labor & Material	600	800	900	3,200
Depreciation	600	900	1,100	3,200
Fork Truck Fuel Cost	200	200	100	—
<b>Total</b>	<b>\$ 6,800</b>	<b>\$ 4,900</b>	<b>\$ 3,500</b>	<b>\$ 6,900</b>
COMPARISON OF SYSTEMS				
Total Operating Cost	\$ 6,800	\$ 4,900	\$ 3,500	\$ 6,900
Allowance for 10% Net Return*	2,500	3,200	3,800	10,500
Cust. Oper. Cost — Including Return on Investment Allowance	\$ 9,300	\$ 8,100	\$ 7,300	\$17,400
Order of Merit	3	2	1	4
Supplier Cost + Ret. on Invest.	\$92,200	\$85,700	\$89,300	\$89,200
Customer Cost + Ret. on Invest.	9,300	8,100	7,300	17,400
<b>Total Cost + Ret. on Invest.</b>	<b>\$101,500</b>	<b>\$93,800</b>	<b>\$96,600</b>	<b>\$106,600</b>
Overall Order of Merit	3	1	2	4

\*Desirable net return assumed at 10%



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Check 4403 opposite last page

### How IPD Works

From page 43

Based on the results of test work and the economic analyses, the following conclusions were reached:

1. Three proposed systems (metal returnable bulk containers, expendable bulk containers, and railroad hopper cars) were found to be more economical for the supplier than the multiwall bags now in use.

2. The metal bulk container proved to be the most economical for the customer. However, long-term leases and commitments are required with these containers. Also, difficulty in discharging from the metal containers (due to the nature of the product) indicated the need for additional development work in redesign of containers and discharging equipment.

3. The expendable bulk container was found to be the second most economical system for the customer. No long-term leases or commitments are required, and test work showed that these containers could be discharged easily with commercially available equipment.

4. Hopper-car shipments were most expensive for the customer because of the high investment in plant unloading, storing, and conveying equipment; the use of hopper cars also involves long-term leases and commitments. In addition, test work indicated some difficulty could be expected by the customer in discharging product from hopper cars.

Based on these conclusions, it was recommended that the customer review his needs in the light of the test work and economic analyses, and decide on type container desired.

After a thorough study, the customer asked that the expendable bulk container be used for his shipments as soon as the necessary facilities could be installed.

It should be emphasized that this economic evaluation applies only to this specific product and set of conditions. Each type of container included in this evaluation has application under the proper conditions. Detailed IPD systems analyses must be made to determine optimum system.

## Puder on IPD

From page 42

ate with a minimum inventory. If our plant is not near a large marketing area, we must provide the means to make our goods available quickly and easily on a 24- to 48-hour service basis.

With this rapid turnover of goods, we must equip our warehouses to provide the desired customer service. For example, our systems approach considers the advisability of shipping products in bulk for packaging at the warehouse. This secures savings through bulk movements and local procurement of containers. More rapid customer service can also be achieved.

### Transportation

Transportation usually considers conventional shipping methods — carload, truckload, less carload, and less truckload. Under the overall systems approach, we also consider other methods such as pipelines, water transportation by ship or barge, and air freight.

The possibility of equipment additions to the conventional truck or rail car plays an important part in selecting the method of shipment. The use of bulk hopper cars and boxcars containing permanent bracing should receive consideration.

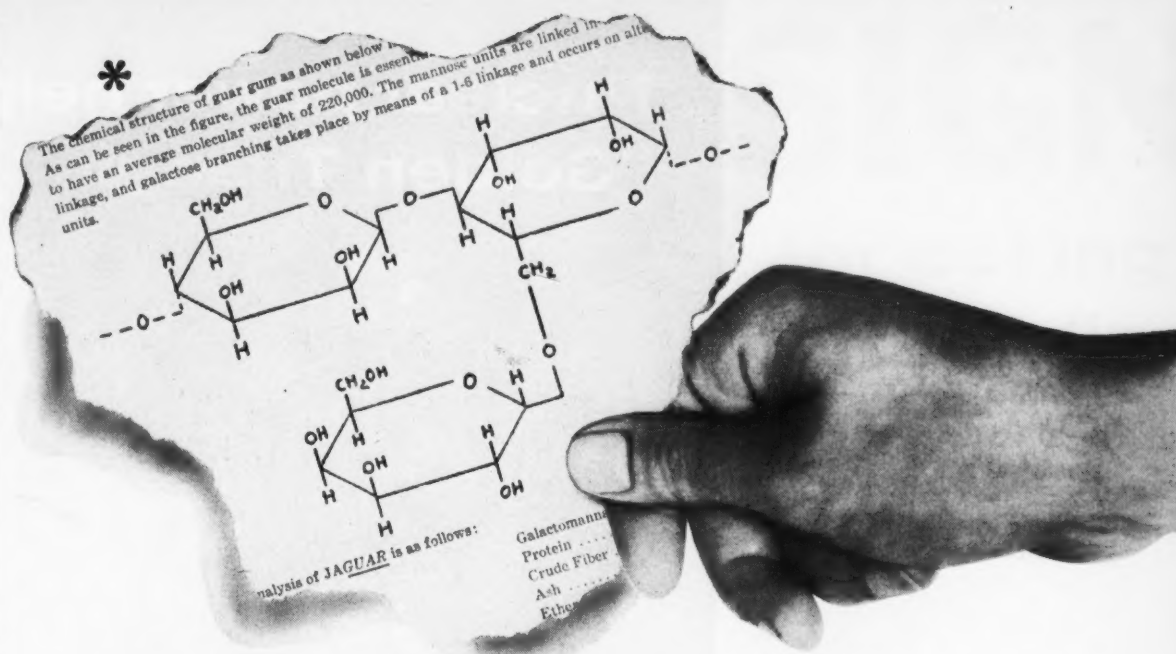
The availability of special trailers such as tanks, hopper bottoms, dump body, and self-unloading types has contributed to the wide-spread use of trucks. An interesting newer development is a special truck body designed for carrying soluble materials. The cargo is unloaded by dissolving the material and pumping the solution. This idea is especially productive when the first stage of the customer's processing involves putting the product in to a slurry or solution.

Now that we have discussed the four engineering fields, let us look at the tools within these fields.

### Product

Let's assume a product is manufactured in one crystalline form. It is usually simple to select a standard container and start shipments.

To bottom page 179



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\*Molecular structure from page 6 of this booklet.

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Check 4404 opposite last page



# Nuclear power helps light "Golden Triangle"

**Operation of the Shippingport PWR marks another milestone in the peaceful use of atomic energy. Feeding 60,000 kw into the Pittsburgh area, is the world's first full-scale A-plant devoted exclusively to civilian use.**

**TED F. MEINHOLD**  
Associate Editor



**L**ocated along the Ohio River at Shippingport, Pa., about 25 miles northwest of Pittsburgh, is the world's first full-scale nuclear power plant devoted exclusively to civilian use. Built as a joint project by the AEC and Duquesne Light Company, total cost ran over \$121 million.

Ground was initially broken in September 1954. On December 23, 1957 — 39 months later — the plant began operating at full power, producing 60,000 electrical kilowatts. This is more electricity than any other individual reactor in existence has turned out. By 1960, when a second core will have been installed, output will be boosted to 100,000 kw. The power produced is connected to the Duquesne network which supplies Pittsburgh and surrounding areas.

Cost of producing a kilowatt of electricity by atom power is estimated to be about 64 mills per kwh, compared to a national average of about 6 mills for conventional plants. However, with the experience and knowledge gained at Shippingport, nuclear power costs should drop. Experts

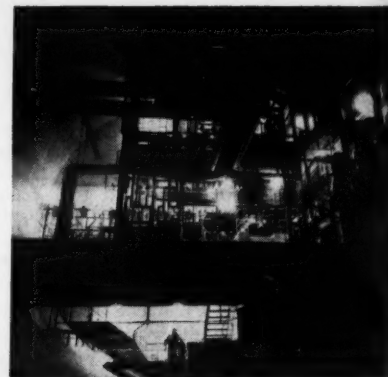
predict that by 1980 approximately 60% of new power plants will be atomic. Construction costs should shrink too.

Reactor at Shippingport is a pressurized water type having a primary closed loop operating at 2000 psi. Core contains 14 tons of natural uranium and 165 pounds of enriched uranium, is six feet in diam and six and one-half feet high. Pressure vessel in which core is housed is 33 feet high and 10 feet in diam. Walls are eight inches thick. Vessel is sunk in a water-filled canal 43 feet deep, 22 feet wide, and 110 feet long. This serves as a radiation shield. Four huge underground chambers contain piping, heat exchangers, and other auxiliary equipment.

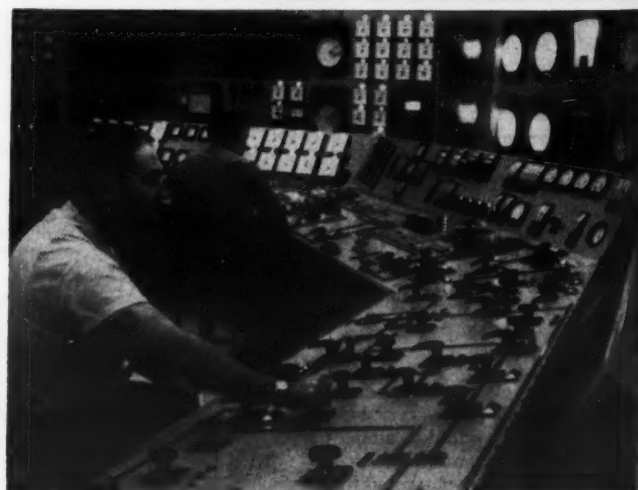
**Produces 68,000 kw**

Water leaves core at 540°F. It is sent to heat exchangers where it converts boiler water in secondary loop into 585-psi 486°F steam. The steam drives turbine generators producing 68,000 kw, 8000 kw of which is required for the station's own service

Inside this 50'-diam x 147'-long underground auxiliary container is a large portion of 100,000 feet of pipe extending through the plant. Two large pipes near top at left are main steam lines leading from heat exchangers inside one of three other chambers



"Instructions" to reactor are issued by three operators sitting at console panel





Final check being made on instrumentation tubing on top of reactor before start-up



Two-ton door seals off auxiliary chamber of atomic-electric generating plant from rest of facility

(5500 kw is needed to operate circulating pumps, and 2500 kw for lighting and other auxiliaries). Heat output of reactor is 236,000 kw. Water is used as both moderator and coolant. About 50,000 gal are pumped through the four primary loops each minute.

Nuclear portion of plant was designed and constructed by Westinghouse. Duquesne Light provided turbine generating portion and site. It is operating the entire plant for the AEC.

#### Forerunner of Larger Plants

The Shippingport installation is the first of five large-scale nuclear power plants scheduled for operation in the US by 1960. Others are: The

Power Reactor Development Company's Enrico Fermi plant (fast breeder) near Monroe, Michigan, 100,000 kw; Commonwealth Edison's Dresden plant (boiling water) southwest of Chicago, 180,000 kw; Consolidated Edison's plant (pressurized water) at Indian Point, New York, 163,000 kw; and Yankee Atomic Electric Company plant (pressurized water) at Rowe, Mass., 134,000 kw. When these plants are finished, the US will have over 650,000 kw of installed nuclear generating capacity.

(Further information about the nuclear portion of the Shippingport plant can be obtained from Westinghouse Electric Corporation, Pittsburgh 30, Pennsylvania.)

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Check 4405 opposite last page

What happens after the merger? Too often, it's a case of corporate indigestion caused by inability of the new company to assimilate the merging organizations. Marketing problems are among the big headaches. Here are some prescriptions by two specialists.

## Solving marketing problems after merging

**RICHARD F. MESSING**  
and **PAUL D. SHUWALL**  
Arthur D. Little, Inc.  
Cambridge, Massachusetts

**M**INIMIZING of potential marketing problems by planned efforts prior to merger can be extremely rewarding. Yet, curiously, company market positions and sales functions are often slighted in pre-merger negotiations, while considerable analysis is devoted to financial resources and production facilities.

How will specific marketing problems arise after merging? This depends on the type of merger. A forward integration can provide product outlets and tend to reduce marketing problems. But competition with one's own customers may arise. Also, marketing knowledge and techniques required to sell a raw material are not generally applicable to sell finished products.

Indeed, the management of the "new company", if it comes primarily from the merging company, may require extensive "education" in the product markets of the merged company.

In a backward integration, different marketing problems are involved. When an end-product manufacturer combines with a supplier of raw material, there is reduced emphasis on marketing the intermediate product, and new effort is placed on marketing any surplus end product. This problem becomes acute if the new management comes from the intermediate products company.

Further problems include the fact that although most marketing needs for the final product remain the same, price structure



**RICHARD F. MESSING** has been associated with Arthur D. Little, Inc. since 1945, engaged principally in technical-economic studies of the process industries. His investigations have included reviews of marketing programs and organization requirements, market potentials, company acquisitions and diversification opportunities. A chemical engineer-economist, Mr. Messing is manager of ADL's Industrial Economics section.

may change with an improved raw materials position. Another problem is that reciprocity agreements will likely require re-negotiation.

When merging two companies with similar or identical product lines, the major effort is consolidation, guided by selection of compatible activities from both companies. The major need is elimination of duplicate activities at the earliest possible time. Thus, thought must be given to developing future activities best utilizing resources and strengths of the combined organizations.

### First Steps

Staff coordination is one of the most immediate problems after merger, since management has become increasingly dependent upon staff functions for information. Projects and staff assign-



**PAUL D. SHUWALL** has worked with Mr. Richard Messing as a member of ADL's Industrial Economic section for approximately the past two years. Mr. Shuwall has been active in chemical market research studies, company acquisition and diversification evaluations, plus plant location investigations. His background includes degrees in chemistry and business administration.

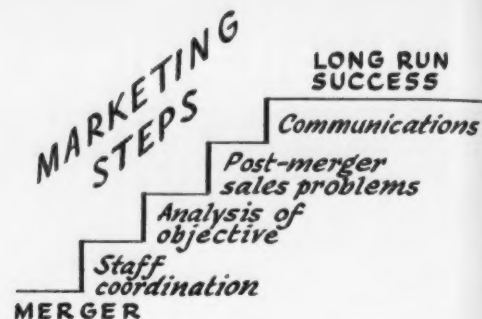
ments, including communications between top management and staff, should be on a "merged" basis as early as possible.

Standard operating routines must be set up as rapidly as possible, preferably before the merger, to minimize confusion and waste effort.

### Second Steps

Over the short term, a company can operate very satisfactorily without specifically defined objectives. It may even be desirable to do so until management develops a clearer idea of its new resources.

But inevitably, certain problem areas must be considered, such as analysis of the company's long-term marketing objectives, and re-grouping of marketing personnel into a more effective organization. (It is frequently



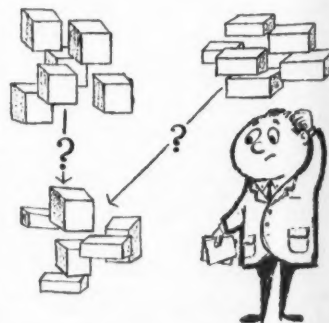
best to minimize re-grouping of personnel immediately after a merger action. Later, when they have become accommodated to the new environment, individual changes can be made with a minimum effect on morale and performance.)

### Post-merger Objectives and Problems

Most common of post-merger marketing problems involves product line — selection of products from the merged lines. Sales compatibility of items, similarity of markets, and capabilities of sales personnel are factors in selection. So are probable future growth, profitability, and requirements by certain customers for specific products.

Of course, certain markets may be dropped because of injury to inter-company relationships by the merger action.

As market and competitive conditions change, further revision of product line will be necessary to prevent future obsolescence of product line. Problems of product line must not be allowed to lapse until a crisis forces attention to them.



Selection of products from the merged lines is most common post-merger marketing problem



Most difficult will be solution of pricing problems when a newly merged company enters unknown markets—overcoming the problem of both formal and informal pricing patterns to which individual companies adhere. It is difficult to discover and adapt to the more informal pricing patterns and practices unless the company's personnel have previous experience in the field.

Best approach is clarification of pricing policies to both personnel and potential customers right at the beginning. Revisions can be made later, once the company becomes fully familiar with product, markets, and competition.

Sure source of trouble to be avoided is complete transfer of pricing policies from the old to the new product line. Such an entire transfer of operating policy is only rarely successful.

#### What about Discounts?

It may be that one result of the merger will be the need to consider problems of trade discounts, service allowances, or even price discounts when customers exert pressure.

In a soft market these nuances must be handled carefully so as not to precipitate industry-wide price competition.

Pricing policies of a merged company will also require change with changes in distributors or agent relationships. Discounts allowed resellers often vary on basis of negotiated contracts and services provided. Mergers often change the need for these services. Also, dealer relationships concerning resale of off-grade material and export material will have to be reconsidered.

#### Reciprocity: Top-level Subject

One other pricing problem requiring attention is that of reciprocity. This concept is based on total benefits two or more companies can derive from doing business with each other.

Because this relationship is subject to change after merger, immediate reconsideration of what the newly merged companies can offer — and demand — is in order. Product line changes may open

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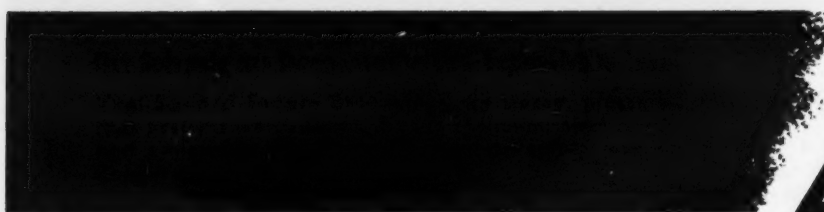


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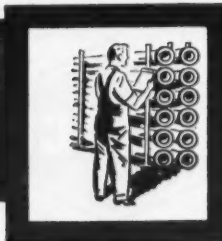
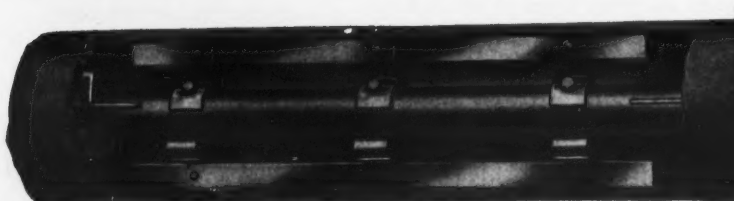
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new areas for reciprocal consideration. Changes in purchasing authority and management-to-management relationships may affect the reciprocity. Because of general reluctance to discuss reciprocity at any but the highest levels, this is a subject for top management of the newly merged company.

### Regrouping Personnel

Combining technical service groups of the merged companies is an excellent opportunity to evaluate capabilities of individuals, and to match them with requirements of the new product line and industries served.

If management of the newly merged company has not previously been involved in technical activities, establishing technical service policies can be a problem. The short-term satisfactory answer is to permit persons responsible for technical activities to develop a higher degree of autonomy than normal. After management has gained sufficient experience in planning and directing technically oriented activities, this responsibility can be returned to those guiding overall planning.

As the market research and development groups of the companies will have been rather deeply involved in pre-merger analyses, they will have acquired initial familiarity with product lines and sales set-ups. Thus, they are in a position to provide management with early information for basing decisions in the post-merger period.

Problems of long-range product planning may also be assigned to the integrated market research and development staff of the "new" organization.

### Post-merger Sales Problems

Among the more troublesome details after a merger can be allocation of accounts to distributors. Selection of distributors may be based on factors entirely different from those prevailing in the merged companies. Thus, management must analyze, and coordinate the advantages and disadvantages under the new regime.

Further troublesome problems lie in the compensation plans for sales personnel. It

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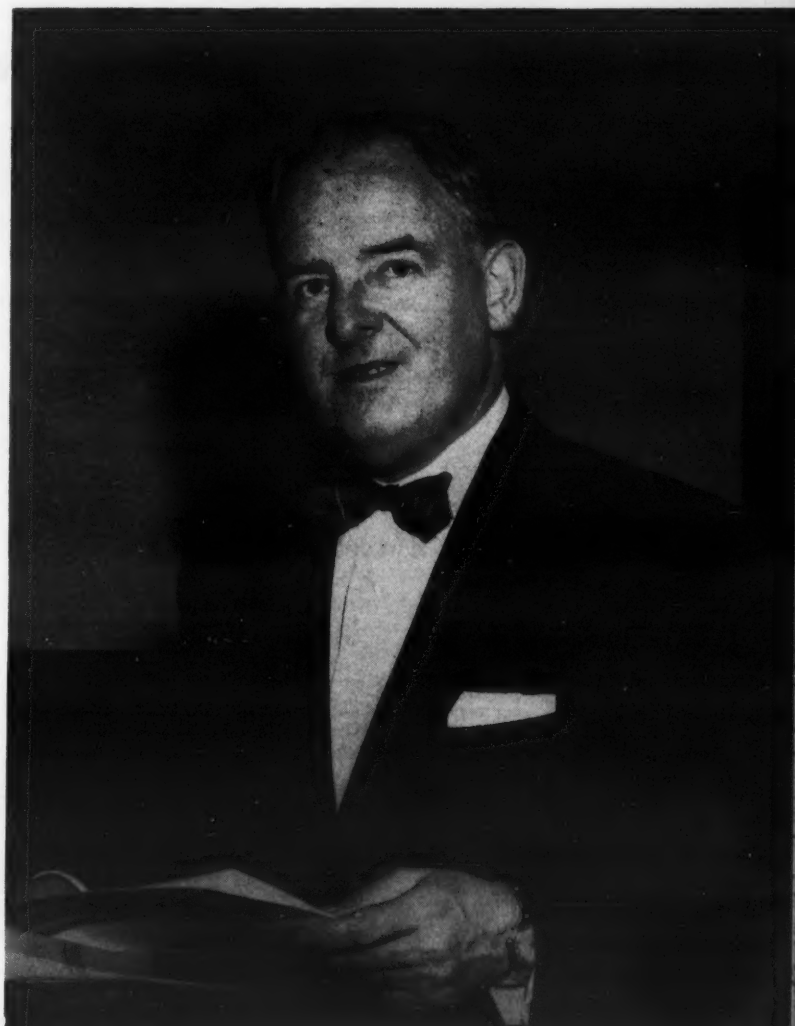
When a relatively low-volume/high-dollar value chemical maker like a producer of drugs goes into a low-price/high-volume business like petrochemicals, the first question occurring to the observer is 'why'? To find the answers, Chemical Business asked Administrative V-P Al Greene and Special Projects Manager Carl Setterstrom about Pfizer's recent merger with Morton-Withers. Here are their answers concerning ...

## *Pfizer, Drugs, and Petrochemicals*

"To keep the record straight, Pfizer has always been a chemical producer of considerable magnitude. As a matter of fact, when the company was organized back in 1849, it started out as a small fine chemical plant in Brooklyn," explained Pfizer Administrative V-P **Al Greene**, the man primarily responsible for the new chemical operations. "While the Morton-Withers operation calls for different feed stocks and, to an extent, different processes, we consider it an adjunct to rather than a departure from our existing business.

"You see, Pfizer's chemical operations are based on three 'legs' — fermentation chemicals, that is, citric acid, the antibiotics, and such; products from higher organisms, such as the vaccines, serums; and, then, the products of organic synthesis. And this third leg — the synthesis — was the one we wanted to strengthen. We were looking for a low-cost process using the olefins as feed stock — and something with a pretty broad industrial business and few fluctuations.

"I guess the first things we looked at were polyethy-



Pfizer's Al Greene



## CHEMICAL BUSINESS

lene and ethylene oxide and glycol; but, for various reasons, those weren't for us. They were rather 'old and tired;' we wanted something new."

### The Meeting

Pfizer and Morton-Withers got together almost by accident. M-W had been founded by **Joseph Morton** and **John Withers** in 1950. Its main business was making various specialty products that the bigger companies didn't want to mess with. But they also had an interesting basis for a process to make alkyl groups with which to alkylate benzene — and the process was based on olefins.

The process was aiming at additives for heavy-duty motor oil — and had excellent market potential. The materials have been in pretty short supply because they have never been produced by a direct route; rather, they are by-products of either other detergent manufacturing or of petroleum refining. But M-W needed money to develop the process further and to put up a pilot plant.

So Withers went to one of his college instructors who was doing consulting — for Pfizer, among others — hoping to find someone to throw in with.

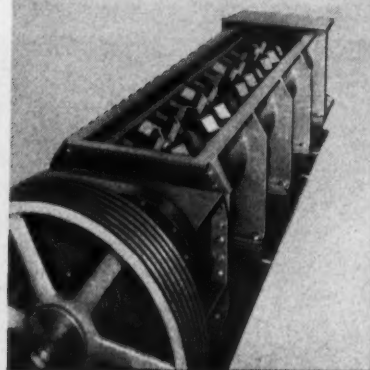
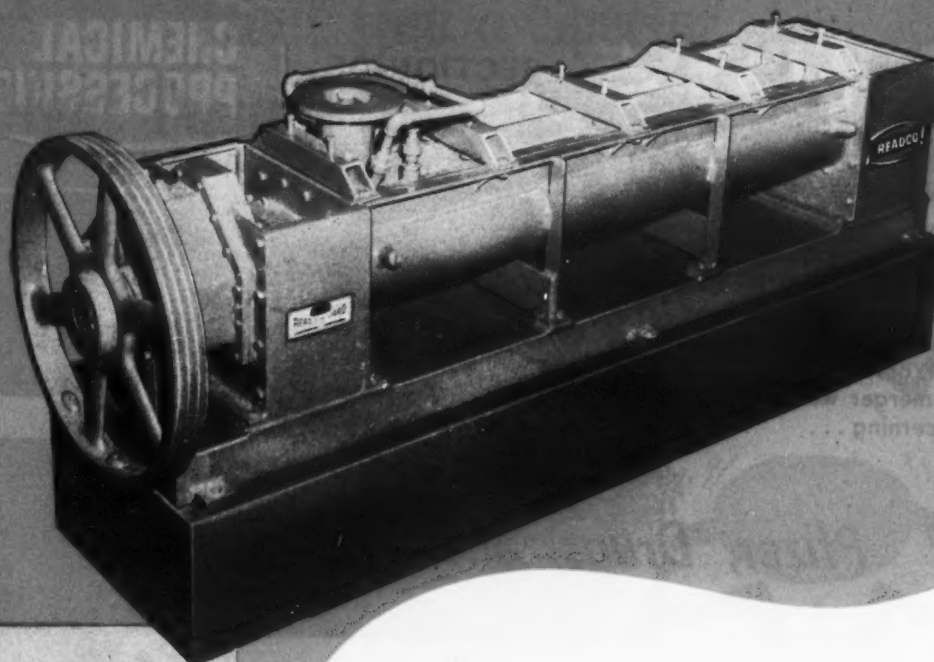
They needed money; the consultant knew that Pfizer wanted a process based on olefins; they decided to do business.

### The Deal

Pfizer's first move was to loan M-W money for development of the process and to build a 10-million-pound pilot plant, as well as take a one-year option on the deal.

Later, when the process got off the ground, Pfizer exercised the option and formed the Morton-Withers division.

"Our next move," explains Special Projects Manager **Carl Setterstrom**, "after the products have completely



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## CHEMICAL BUSINESS

proven themselves, will be to put up a full-scale plant near an olefin source — on the Gulf Coast, I suspect.

"Our long-range plan," Setterstrom continues, "is to strengthen our position in the chemical industry, building in three basic areas — plasticizers, intermediates, and surfactants. And the Morton-Withers division fits into each of these areas very nicely.

"On plasticizers, for example, where Pfizer had been producing somewhat less than a complete line, M-W can produce a complete line. We have an excellent raw material position for manufacture of the Citrollex plasticizers based on citric acid while M-W isn't in such a good spot. Both of us, of course, have considerable experience and know-how — you can be sure that these will complement each other. And, perhaps most important, we just didn't have additional capacity; M-W can supply that.

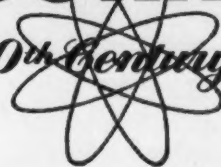
"The same is true of intermediates. We're looking to our itaconic acid to produce polyesters with greatly improved properties, but our experience in polymers isn't so great as it might be. M-W can provide lots of that. We're looking for a number of interesting things to grow from fermentation acids and olefins.

"The same conditions exist in the surfactants area. Pfizer's background in citric acid and sugar based non-ionics coupled with sulfonates from M-W may give us a line — and permit complete technical service — to place us in an excellent competitive position."

To the obvious question, Greene answered: "You can be pretty sure we'll be getting into this thing further. I won't say now exactly the directions in which we'll be moving but our basic policy — that of broadening into stable chemical fields — will certainly continue."

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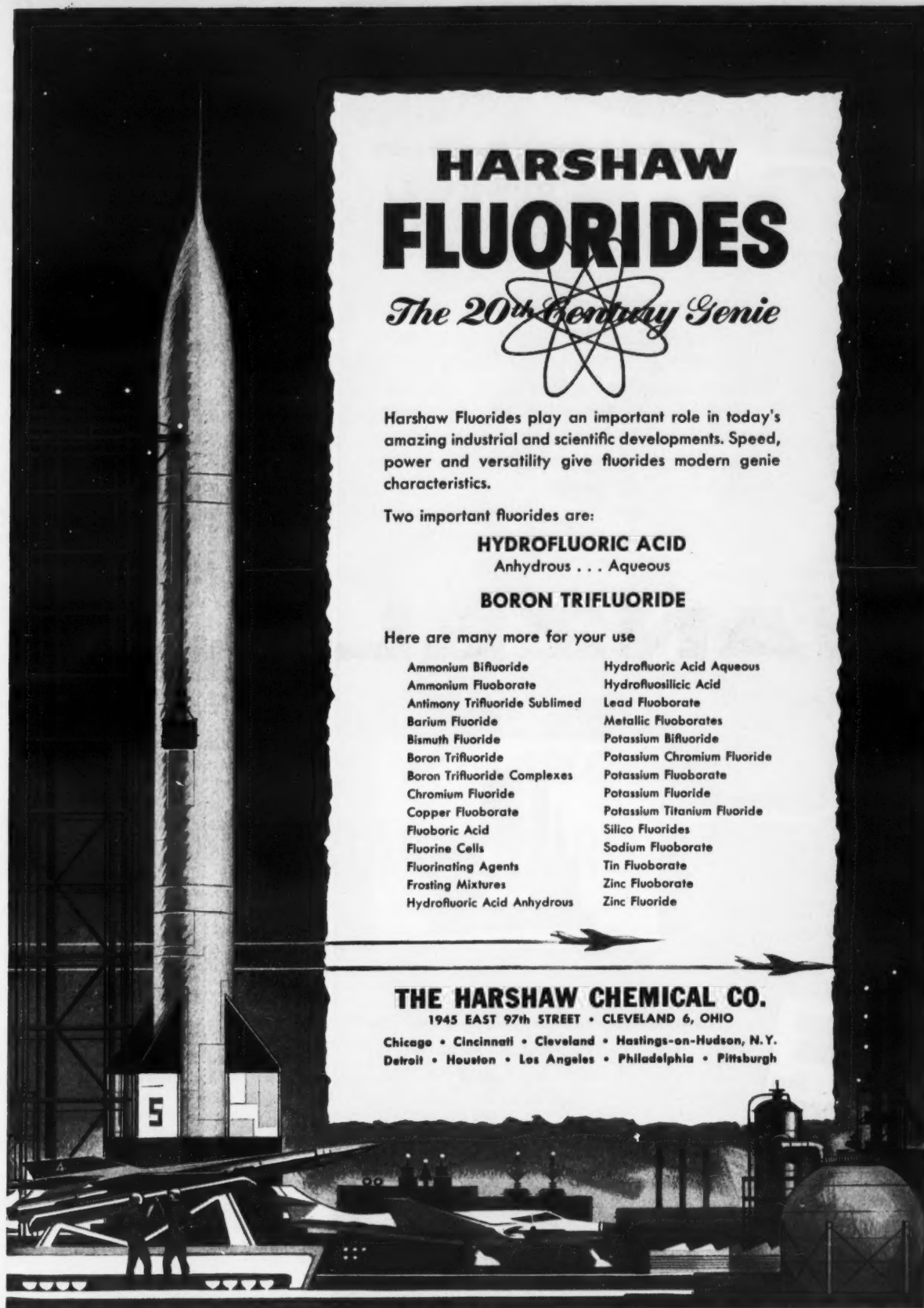
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Bismuth Fluoride	Potassium Bifluoride
Boron Trifluoride	Potassium Chromium Fluoride
Boron Trifluoride Complexes	Potassium Fluoborate
Chromium Fluoride	Potassium Fluoride
Copper Fluoborate	Potassium Titanium Fluoride
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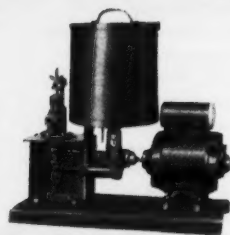
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## cp Marketing



The Canadian chemical market — based on needs of 16 million people — is already over a billion dollars and growing fast. Circles indicate major chemical producing centers

**With 'Buy Canada' becoming the watchword north of the border, US chemical makers are more and more facing up to their problem:**

### Sell Canada Now—or perhaps never

With the latest emotional binge in Canada for the "Buy Canada" movement, accentuated by her elections on March 31, the Canadian attitude and mood toward the United States trade situation is undergoing a metamorphosis likely to peril the largest trade ever developed between our two nations — and lose for the United States its largest foreign market for chemicals.

What can a chemical company in the United States do to either "stay in" or enter the fastest growing chemical market in the western hemisphere, with the single exception of our domestic one? The answer is simple: take full account in operating policies of the Canadian environment and Canadian national interests.

#### Market Sketch on a Thumbnail

Using the market truism the chemical industry is always its own best customer, size of the Canadian chemical market can be gaged by extent of Canadian production of chemicals and allied products which has exceeded one billion dollars annually every year since 1955; rose to \$1.15 billion in 1956 and continued into 1957.

All the way from the easternmost point of Newfoundland to Vancouver, new chemical plants are spring-

ing up. The Canadian chemical industry is moving fast in an already-fast-moving economy. As an indication only, estimated capital expenditures for new plants and equipment are over \$175 million in 1957, up from the \$165.2 million in 1956. New investment in plant capacity since 1945 has been \$835 million, of which 80% has been spent since 1950.

Tremendous growth is the outlook, both in quantity of output and range of products. Even with the capital expenditures mentioned, the industry today is not as large in relation to the general economy as it is in many countries, with the disparity chiefly in the organic field. The intermediate stage

Check 4410 opposite last page



## CHEMICAL BUSINESS

between primary processing and assembly of finished product is mostly lacking, so that an important area of production and consumption is missing.

### Why Is Canada Upset?

Canadians are beginning to feel that a trap is closing in on them, mostly because of increasing trade restrictions against Canadian goods in this country, and secondly, as a result of discrimination against Canadians (whether true or not) practiced by US firms operating in Canada.

Here are some of their complaints: Canadians say large US corporations establish wholly owned subsidiaries in Canada and deny Canadians the right to invest in their own economy. Operating policies of these Canadian subsidiaries are determined in New York home offices (or other US cities) and there is little opportunity for Canadians to advance into management ranks. Further, many of these subsidiaries are discouraged from engaging in research as this is normally done by the parent organization in the US.

### Community Relations

And a final point, more important these days, is that many US organizations fail to bear a fair share of community philanthropies. To quote **J. Alec Edmison**, of the Queen's University in Ontario:

"There are many American concerns who either refuse outright to give to Canadian good works or make a token contribution only. Among firms in this non-cooperative category are some which rely heavily on Canadian engineering talent. Others are keen recruiters of Canadian university graduates in Arts and in Commerce.

"The situation tends to worsen. More and more Canadian firms, previous donors to Canadian universities, are being taken over.

The new management so often says it has no authority to make a donation. We know, from sad experience, that it is usually futile to write to the home office (in the United States) because there they can probably quite truthfully say they know nothing about us or our financial problems."

### Canada's Answers

Regardless of the outcome of the Canadian election of March 31st, Canada is sure to take steps to even the balance to something more closely approximating what She considers fair. Already, strong, bitter representations have been made to Washington through the Canadian Embassy concerning the program of "voluntary" cutting of oil imports which is hamstringing the oil industry in Saskatchewan. **John Diefenbaker** based his election campaign on promises to enact laws inducing American companies operating in Canada to expand opportunities for Canadians in top management and in stock ownership.

Prime Minister Diefenbaker promised specifically: "We intend to introduce legislation for increasing processing of our own domestic raw materials in Canada.

"We intend to insure that Canadians will benefit from the development of their own natural resources. We will not discourage foreign investors but we will encourage them to accept Canadian partnership."

### Will Discourage Trade

To discourage trade with the US, Diefenbaker is looking toward the Commonwealth Economic Conference to be held in Ottawa later this year. Recently, a Canadian commission visited London to explore the possibilities of expanding purchases in Great Britain. A "Buy British" movement is gaining momentum in Canada, and it is being encouraged by government policies. Hearings are being



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Division of HARSCO CORPORATION



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TRANSPORTS



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COUPLINGS

Check 4411 opposite last page

## PROCESS ENGINEERS...

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■ CHEMICAL ANALYSIS  
EQUIPMENT

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for  
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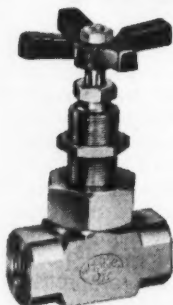
### 340 SERIES BAR STOCK VALVES

Designed with stem threads above packing to resist freezing. Made of corrosive-resistant materials which include Teflon, Hastelloy, 316 Stainless Steel, or Monel. Choice of stem points for on-off service or close flow control. For 3000 psi service. Sizes: 1/8", 1/4", 3/8" and 1/2"



### 360 SERIES UNION BONNET GLOBE VALVES

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when you can buy small*

Check 4412 opposite last page

## CHEMICAL BUSINESS

called at the request of the Minister of Finance for a review of chemical tariff schedules. Canadian manufacturers have been petitioning the government for greater tariff protection for the Canadian chemical industry, and are also pressing for lowering the US tariff barrier to permit secondary products to reach the US market, rather than natural resources only.

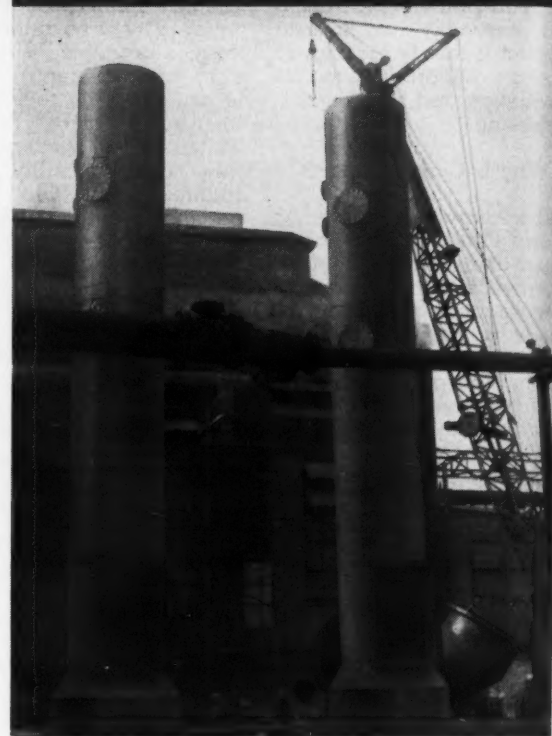
### Marketing Chemicals in Canada

Is it worth while, if indeed possible, to enter the Canadian chemical market now? According to a recent survey by the National Industrial Conference Board, US companies with operations in Canada already are firmly convinced of their value and many are planning to expand their activities. Also, a number of companies, not presently in the market, are very much interested in sales opportunities to be found in the Canadian market.

Conclusion can only be that Canada is an expanding market, but that its status is currently in question. Canadians feel that their quarrels are the same "as would be entertained by Americans if the positions were reversed." Also says **H. Greville Smith**, a director of MCA (Manufacturing Chemists' Assn.) and head of Canadian Industries, Ltd., "One simple remedy . . . (for American firms operating in Canada) . . . is to take full account in their policies of their Canadian environment and of Canadian national interests.

"One way is to give opportunity for participation by Canadians in direction of such enterprises. Another is to participate in Canada's research efforts and in the training of Canadians for positions of technical and managerial responsibility. It is our view that this would be in their own interest no less than it would be in the national interests of Canada."

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Primary gas coolers and towers being erected by The Youngstown Steel Tank Company in the coke department of a major steel producing company located in the Pittsburgh area.

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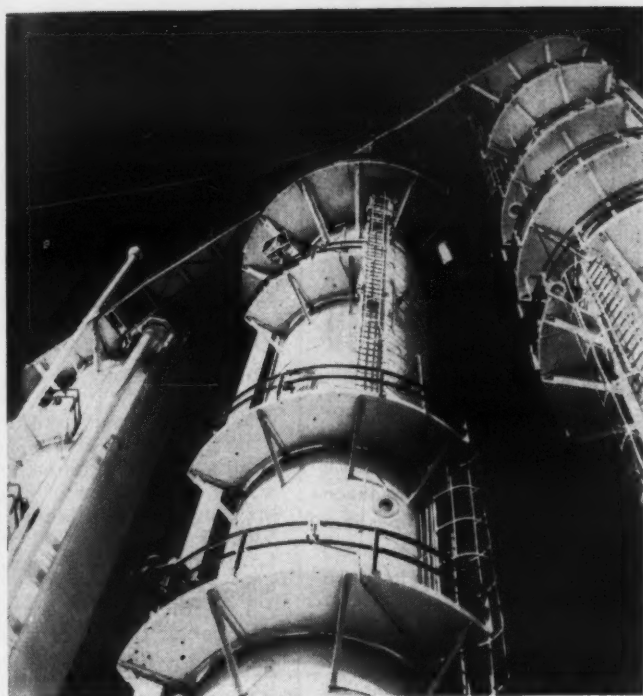


**The YOUNGSTOWN  
STEEL TANK  
COMPANY**

Youngstown, Ohio

Check 4413 opposite last page

CHEMICAL PROCESSING



A portion of Humble's new Baytown benzene unit

## Humble Puts Benzene Unit On Stream

Humble Oil has completed another major step into the petrochemicals field with the completion of its 30-million-gallon benzene unit placed on stream at the company's Baytown, Texas, refinery. The unit, started last April, is the first petrochemical plant to be built by the company in several years.

The operation is also the first to be put up on a 40-acre tract at the refinery set aside as a "specialty products" area. Humble hasn't announced what else will be installed on the site but indications are that further petrochemical expansion is planned.

The new facilities, built by Badger, are integrated with other refinery operations, and the feed stock for the unit will come from a nearby hydroformer. The plant's output will be marketed in the Gulf Coast area. Most of the area's benzene goes into production of styrene, as well as detergents and insecticides.

## Allied Plans Hydrofluor Acid Capacity

Allied Chemical's General Chemical division has announced commencing of construction for a hydrofluoric acid unit at the company's Nitro, W. Va., site. General has other hydrofluoric acid plants at Marcus Hook, Pa., and Baton Rouge, La., and its Canadian affiliate—The Nichols Chemical Co., Ltd.—has recently completed construction of Canada's first such

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TYPE	SIZES	PROPERTIES	VALVES	ASK FOR BULLETIN
1 <b>ACE-ITE</b>	Threaded Pipe ½ to 6"	General purpose rubber-plastic blend. Tough, impact resistant, economical. Handles most common chemicals to 170°F.	Diaphragm valves with Ace-ite body, ½ to 2"	80-A
2 <b>RUBBER-LINED STEEL</b>	Flanged Pipe 1½ to 24" and up	Strength of steel, resistance of hard rubber. Soft-rubber inter-layer aids shock-resistance. Finest for alkalis, most inorganic acids, many organic acids, all salts.	Rubber-lined C.I. Gate, Darling Gate & Check Valves to 24". Diaphragm Valves to 6"	CE-52
3 <b>ACE TEMPRON</b>	Threaded Pipe 1 to 8"	Best anywhere for hot inorganic chemicals, acids, etc. to 260-275°F. Also wide variety of organics. Excellent rigidity.	—	96-A
4 <b>ACE RIVICLOR</b>	Threaded Pipe ½ to 4"	Rigid PVC. Excellent aging. Good cold impact strength. Not affected by most inorganic acids and alkalis. Also good for many organics.	Diaphragm valves with Riviclor body ½ to 2"	CE-56
5 <b>ACE PARIAN</b>	Threaded Pipe ½ to 2"	Odorless, tasteless, rigid polyethylene, best for sub-zero uses. Best resistance of any plastic at room temp. except to acetic acid.	Diaphragm valves with Parian body, ½ to 2"	351
6 <b>ACE HARD RUBBER</b>	Threaded ½ to 4" Flanged 1½ to 8"	The oldest, still tops. Extreme resistance to alkalis, inorganic acids, many organics, all salts. Ideal for chlorine, fluorine. Widest range of fittings.	Rubber-lined or plastic valves above. Also many plug valves, bibb cocks, etc.	CE-51
7 <b>ACE SARAN</b>	Threaded Pipe ½ to 4" Tubing ¼ to 1½"	Odorless, tasteless, general-purpose. Strong, takes high pressures. Not affected by most inorganic acids and alkalis; resistant to most organics.	Diaphragm Valve with Saran body ½ to 2". Also Saran-lined diaphragm valves to 6" and up	CE-58
8 <b>ACE-FLEX</b>	Flexible Tubing ⅝ to 1¼"	General-purpose transparent flexible tubing. Non-toxic, odorless, tasteless. Can steam sterilize. Excellent for chemicals.	Ace hard rubber plug valves, bibb cocks, etc.	66
9 <b>SUPPLEX</b>	Flexible Pipe ½ to 2"	Non-toxic flexible polyethylene pipe. Ideal for water distribution lines, drain lines, jet wells, etc. Resistance similar to Parian. Uses insert type fittings.	Diaphragm valves with Parian body, ½ to 2"	CE-57



ACE Saran, Supplex, Ace-ite and Riviclor are approved by The National Sanitation Foundation for drinking water.

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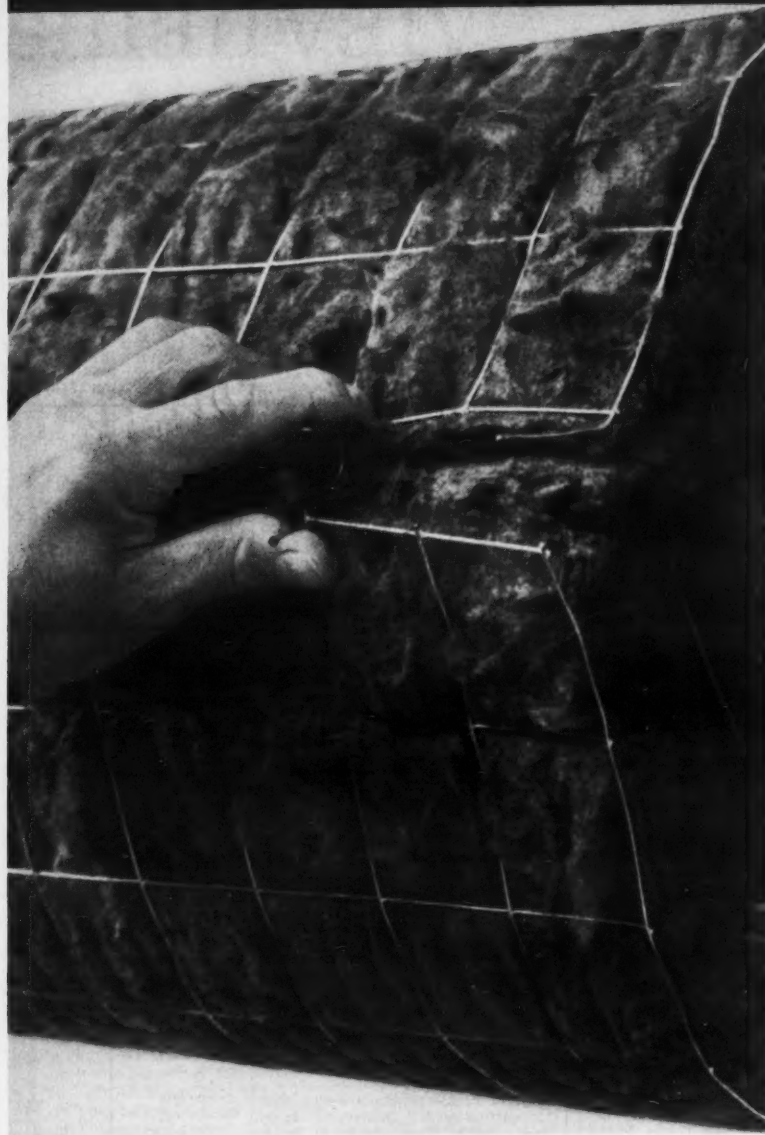


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# BALDWIN-HILL NEW NUMBER 101 PIPE INSULATION

By threading lead wires under the opposite stay wires and bending ends up and over into the felted blanket, each 2 ft. section of B-H No. 101 Pipe Insulation is secured around the pipe or pipes in a matter of minutes. This pays off in saving time and money, particularly on long runs of large diameters up to 30". No costly or time-wasting banding is necessary. Outside finishes of metal sheet or roofing felt are applied directly over the insulation.

B-H No. 101 is fabricated to a uniform density of high temperature and moisture resistant spun mineral wool, specially felted to interlock the fibers and prevent fallout. The insulation is effective on piping heated to 1200° F.

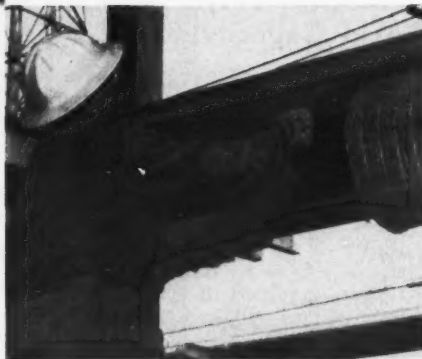
Write for new brochure on B-H No. 101 Pipe Insulation or refer to Baldwin-Hill catalog in Sweet's Plant Engineering File.

## BALDWIN-HILL COMPANY



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Check 4415 opposite last page

### CHEMICAL BUSINESS

facility at Valleyfield, Que. The Division is the nation's primary producer of the material.

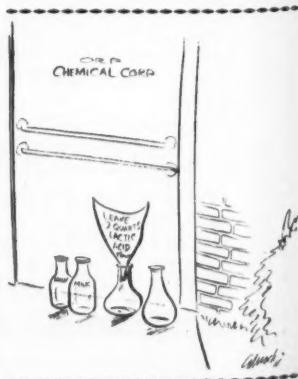
Besides producing acid for the metal and chemical industries, as well as atomic energy requirements, large quantities of captive material are used for manufacture of the company's fluorinated hydrocarbons.

### Vickers Petroleum Forms Chemical Div.

With the statement that "The formation of the division is a significant step towards future growth," Vickers Petroleum President **J. A. Vickers** announced formation of the new Vickers chemical division.

The division's operation will center on Vickers' new benzene-toluene-xylene unit nearing completion at the company's Potwin, Kansas, refinery. The BTX unit is the first such facility to be put up by an oil company in Kansas.

Concurrent with the formation of the division, Vickers announces the appointment of two new officers of the corporation, **William K. Jackson**, v-p in charge of research and development and technical assistant to the president; and vice president for marketing and market development, **Arthur B. Mullaly**. **Dewey Mark** is new general sales manager for the division, and **Richard Boushka** sales coordinator.



### CHEMICAL PROCESSING

## High-energy Fuel Units Scheduled

Two of four processing areas of Callery Chemical's Lawrence, Kansas, high-energy fuel plant will go into production sometime this month. Both areas will produce intermediates for production of liquid fuels for Navy jet aircraft and missiles.

"We expect to be producing fuel for shipment within several months," said **Robert G. Schmidt**, plant manager.

"However, the facilities here at Lawrence will be switched over to production of boron specialty chemicals for commercial and industrial use just as soon as our Muskogee, Oklahoma, plant goes on stream some time in December."

The \$38 million Muskogee plant will be operated for the Navy by Callery.

## Union Carbide Names Marketing Group

A five-member committee with direct responsibility for marketing Union Carbide's chemical products has been named by the company's marketing v-p, **John Field**.

**R. F. Brown** has been named director of sales with responsibility for management of the field sales force. **W. A. Woodcock** is new director of product marketing, **R. M. Joslin** is director, new chemicals marketing.

**H. D. Hughes** is director of sales relations, and **R. L. Bateman** is director for market development.



"It has to withstand 65° below and 1360° above and remain flexible, but of course the lab can work that out!"



from men who produce organic chemicals...

## a new standard for technical assistance

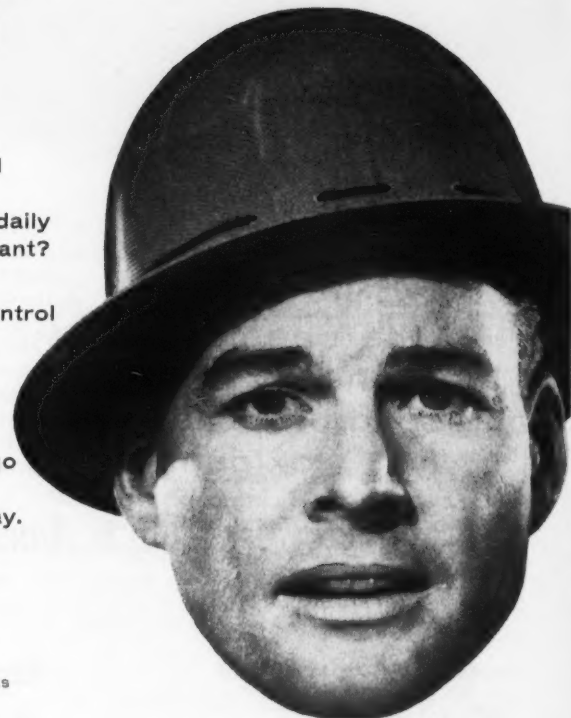
Who is better qualified to give you practical technical assistance on organic chemical problems than the men responsible for the daily operation of a modern organic chemicals plant?

To give you the kind of service you need, operating and design engineers, process control chemists and material handling specialists from our Doe Run Plant are available now to assist your production men with problems common to organic chemicals.

Our experience in producing organics can go a long way in helping you in using these chemicals. For information call or write today.

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of high energy fuels  
and solid propellant  
oxidants.

Wherever men make ready for outer space... from barren arctic IGY laboratories to tropical ballistic missile blast-offs... Trona chemicals are putting the punch into high energy fuels and other propulsion systems. As the only basic producer of these three important raw materials used in high energy fuels and as solid propellant oxidizers—BORON, LITHIUM and AMMONIUM PERCHLORATE—American Potash & Chemical Corporation has a vital stake in the space age. Recipient of the 14th Annual Chemical Engineering Achievement Award for pioneering work in the atomic age metals, Trona continues in the forefront of basic research and technical development of these vital chemicals and their compounds for high energy and missile applications.



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Other Trona chemicals for high energy propulsion: POTASSIUM PERCHLORATE • LITHIUM NITRATE • LITHIUM PERCHLORATE • LITHIUM METAL  
RUBIDIUM & CESIUM • TRIMETHYL BORATE • TRIMETHOXYBOROXINE • DECABORANE • ELEMENTAL BORON • BORON TRICHLORIDE • BORON TRIBROMIDE

### C. P. Hall Announces Facilities Expansion

The C. P. Hall Company of Illinois, Chicago manufacturer of esters, surfactants, defoamers, and plasticizers, has announced expansion of its manufacturing facilities. The new construction, to be completed this month, will provide additional office and warehousing space as well as releasing additional existing space for manufacturing purposes.

### Ashland BTX Plant Plans Start-up This Month

Initial operation by mid-April is scheduled for the new aromatics plant now being completed by Ashland Oil & Refining Company at its Buffalo, N.Y., refinery.

The units are designed to expand into production of a variety of intermediates and feed stocks from aromatics including cyclohexane, methyl cyclohexane, para xylene, ortho xylene, and maleic anhydride.



### The Year's First

Max Minnig, Witco president (center), and Harry Rehnberg, president of Scientific Design (left), discuss model of the first organic chemical operation to be announced for 1958—Witco's 20-million-pound phthalic anhydride plant to be built outside Chicago. At right is W. A. Alexander, SD senior v-p who will direct construction of the unit, scheduled for completion early next year.

Check 4417 opposite last page



## cp Spotlight on people

**Fred J. Emmerich** is named to receive the Society of Chemical Industry's Chemical Industry Medal for 1958 "for conspicuous services to applied chemistry." Emmerich is past chairman of the board for Allied Chemical.

J. T. Baker Chemical announces the appointment of **Dr. Charles H. Schramm** as director of research.

**B. R. Putnam Jr.** is appointed manager of the petrochemicals department of American Cyanamid's organic chemicals division. And at Cyanamid's fine chemicals division, **W. T. Knight** is made field sales manager. More from Cyanamid . . . vice presidents **Kenneth H. Klipstein** and **George R. Martin** are elected to newly created offices of executive vice president of company. And **Dr. L. P. Moore** is elected to succeed **F. S. Washburn** as president of North American Cyanamid Limited, Canadian subsidiary. Washburn will devote full time to responsibilities as general manager of Cyanamid's phosphates and nitrogen division.



Putnam

**Augustus C. Long**, chairman of the board and chief executive officer of The Texas Company, is elected a board member for Freeport Sulphur Company.

New sales manager for Girdler catalysts in the chemical products division of National Cylinder Gas is **John W. Benedict**.

**Warren M. Anderson** is new sales manager of Union Carbide Olefins, division of Union Carbide. Koppers Company forms two new organizations to replace company's former chemical division: plastics division, and chemicals and dyestuffs division. **David L. Eynon Jr.**, former president of the Mobay Chemical Company, will head up the plastics division as vice president and general manager. Chemicals and dyestuffs will be headed by **T. C. Keeling**



Eynon

**Jr.**, who is named vice president and general manager of the division.



Keeling

**E. Leonard Borg** becomes manager of synthetic rubber development for the Naugatuck Chemical division of United States Rubber Company.

Jefferson Chemical Company appoints **James C. Hance** manager, market research, of commercial development division.

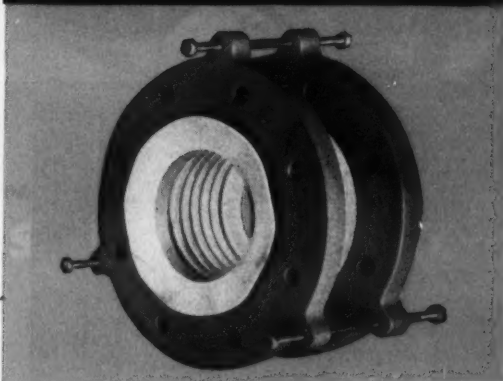
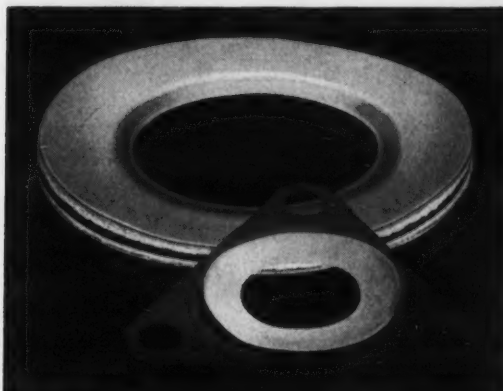
**Parker S. Dunn**, vice president, manufacturing, of American Potash, is elected to company's board of directors. And **Frederick Marsic** is elected secretary of company while **Henry DeArmond** becomes assistant secretary.

With the formation of a divisional development department at Monsanto's plastics division, **David S. Plumb** is made director and **Dr. Harry M. Walker** is appointed assistant director of the department. **H. E. Eckert** is named assistant general manager of plastics division.

**Thomas G. Gibian** is named general manager of organic chemicals division of Dewey and Almy division of W. R. Grace.

## Chemiseal® Gaskets

. . . with protecting Jackets of du Pont TEFLON, are impervious to chemical attack. Made with a variety of filler constructions to suit every connection problem—every pipe and nozzle material requirement—whether glass, ceramics, stainless, Karbate, Haveg, glass-lined steel, etc. That is why Garlock 8764 Chemiseal Gaskets have become the standard choice of the process industries. Catalog AD-154.



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for  
chemical  
piping

## Chemiseal® Expansion Joints

. . . and Flexible Couplings, made of chemically impervious du Pont TEFLON, protect costly piping against shock and vibration, thermal expansion and contraction. Correct misalignment. Connect unlike piping ends and nozzles. Eliminate slip-joints, gaskets, adaptors. Companion Products to the famous Garlock Rubber Expansion Joints. Catalog No. AD-137.

For prompt service, contact one of The Garlock Packing Company's 30 sales offices and warehouses throughout the U.S. and Canada, or write

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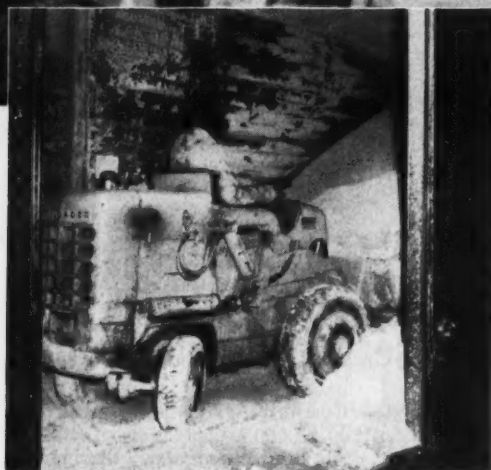
Plastics Division of  
GARLOCK



Check 4418 opposite last page



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*One of Maloney's model HA "PAYLOADER" units can unload a 50 ton car of superphosphate in 45 to 60 minutes with 35 ft. one-way haul.*

"Our long experience with 'PAYLOADER' tractor-shovels has thoroughly job-proven them on our operations" says A. J. Nolen, Superintendent for Maloney Fertilizer Company, Charleston, S. C. "The new model HA roll-back bucket action and the torque converter drive has almost doubled the production and greatly reduced the normal maintenance. The roll-back, low-carrying action also means less spillage insuring a cleaner, safer operation."

Fertilizer mixers and chemical plants of all sizes have proven in their own plants that the superior experience and design in "PAYLOADER" tractor-shovels pays off with more production and performance.

There is a "PAYLOADER" size for your every tractor-shovel use, beginning with the popular model HA, and up to 9,000 lb. carry capacity. They all feature the 40° roll-back bucket action and hydraulic load-shock-absorber that carry big loads low and close with maximum stability and safety, and minimum spillage loss.

See your Hough Distributor for full details. Ask him, too, about scarifier teeth attachments to loosen packed fertilizer, and about Hough Purchase and Lease Plans.

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Send "PAYLOADER" information on:

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Modern Materials Handling Equipment

**THE FRANK G. HOUGH CO.**

LIBERTYVILLE, ILLINOIS

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



Check 4419 opposite last page

## Marketing Steps

From page 50

is extremely unlikely that the merged companies will have a common basis for compensation. Even if straight salary was used in both companies, historical inequities will be present. The problem becomes acute in sales incentives, either commissions or bonuses. An orderly transition from the old to the new pattern is essential.

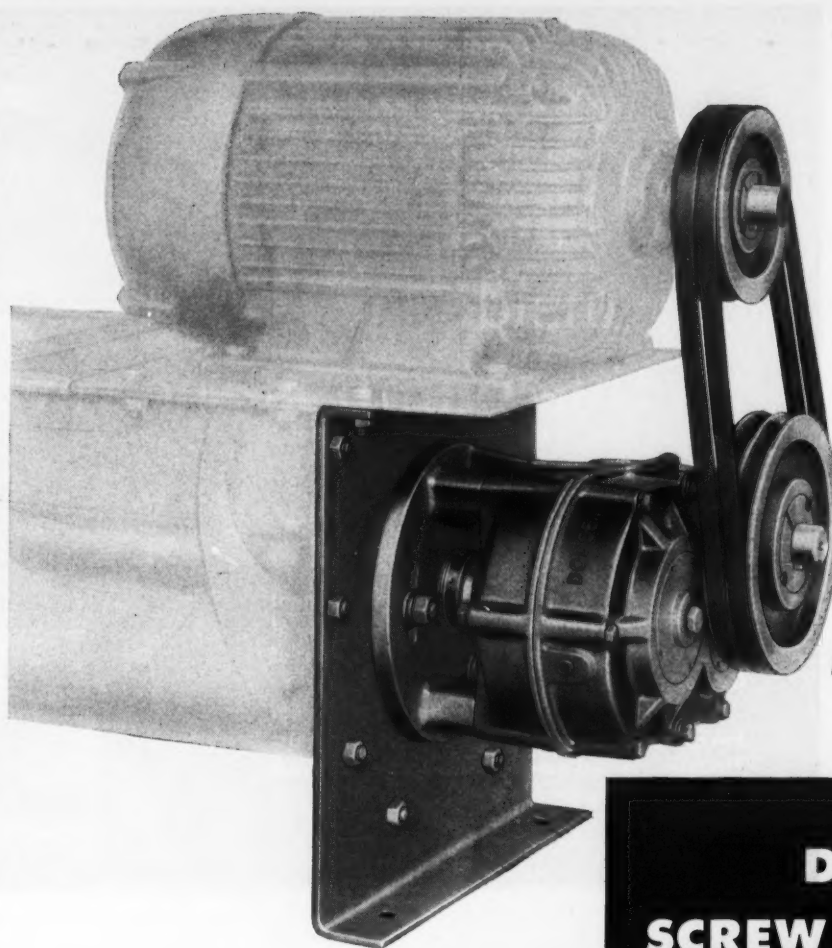
Sales promotion efforts may be among the more difficult categories to resolve. In many cases, each company will have expended effort and money to place its products and trade names before the public in a favorable light. Effort is required to maximize the return from this activity; yet preserving autonomy and strength of the combined organization.

Advertising methods may require a new treatment. Different media may be required to promote different classes of products, and relationships of advertising expenditure to sales volume may change appreciably. An immediate increase in advertising expenditure may be required to announce the facts of the merger to customers and others in the trade.

Other considerations, of varying importance, will arise once the merger has been consummated. Realignment of field sales forces and staff services provided for sales are two. Others are sales training in new products, export sales, reallocation of territories, trade standing of sales personnel. This last is so important that it frequently is the basis for considering a merger action.

### Maintaining Communications

One casualty of a merger may be communications between sales and other company operations, such as finance, production, and research. Effort is required by the marketing group to overcome the effect of the disturbance at merger time. New responsibilities of individuals and departments bear watching to assure preservation of communication needed for most effective conduct of the sales function. Often, more



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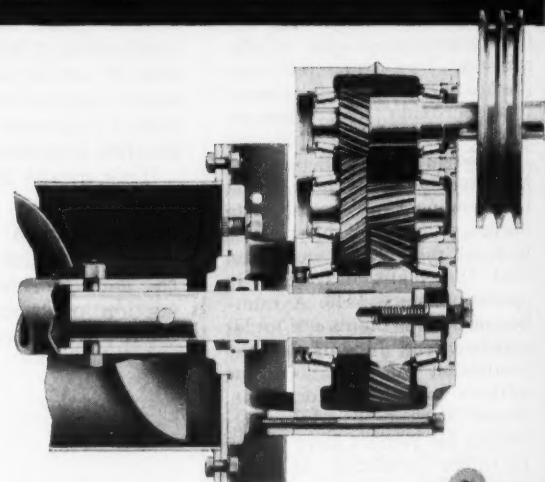
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formalized reporting procedures are necessary. Other measures are sometimes necessary, such as company seminars, interdepartmental discussions, publicity in company publications.

The same reasoning applies to communications with outside suppliers and customers. A comprehensive and formal system will be required to keep them aware of factors bearing on the company's sales success. During this transition period, sales management of the newly formed company must demonstrate flexibility and objectivity for the long-run success of the enterprise. ■

## Russian Chemicals

From page 28

travel from industry to industry.

The Russian chemical industry is today at a turning point. While at the present time they have no new products or processes that will startle us, there is a considerable chance that they will in the future. This might well be described as the possibility of a chemical "sputnik." I'll give you an example.

Until recently we were under the impression that the first commercialization of the process for manufacturing phenol and acetone via cumene hydroperoxide took place in Canada in 1953. In 1956 and 1957 Soviet technical publications revealed that their chemical engineers were able to design a plant for this process without pilot plant work and that the plant has been in operation since 1949. A number of similar plants are under construction. Judging by the reputation of some of the authors of this information, whose work I have been following for years, I have reason to place credence in their statements. Acetone has a wide utility range in the Soviet chemical industry.

The point is this: Although the major efforts of the Soviets up to now have been

# The glass inside this pump is the revolutionary

Here's a unique new centrifugal pump that joins the unexcelled corrosion resistance of Pfaudler glass to the sturdy construction of Goulds pumps.

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There are 6 important reasons for calling this new pump revolutionary in its usefulness to anyone pumping corrosives.

**1. Corrosion resistance.** Every pump surface that touches the pumpage is glassed. The borosilicate glass formulated specifically for pump application does not depend upon a passivating film for protection. It therefore offers excellent corrosion resistance to all acids (except hydrofluoric) even at elevated temperatures to 350° F. and to alkalis at moderate temperatures.

This means long service—unmatched freedom from corrosion.

**2. Elimination of stuffing box problems.** The pump's unusual design places the stuffing box on the suction side of the impeller, subject to low suction pressure only. Inherently, this arrangement insures long packing or seal life and freedom

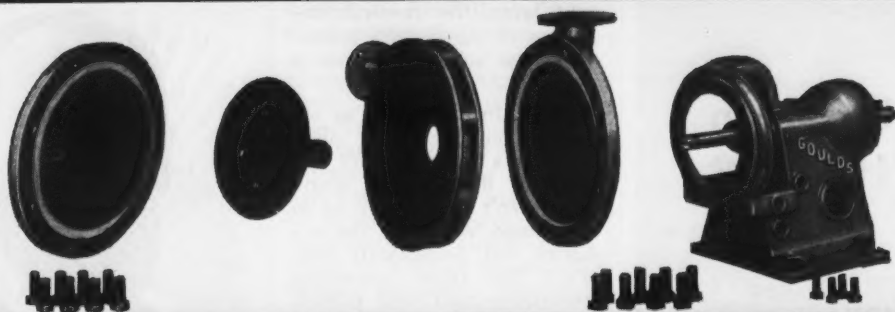
from excessive leakage.

You can get this pump with any mechanical seal arrangement to handle not only clear corrosive liquids, but also abrasive slurries. It is also available with packed stuffing box.

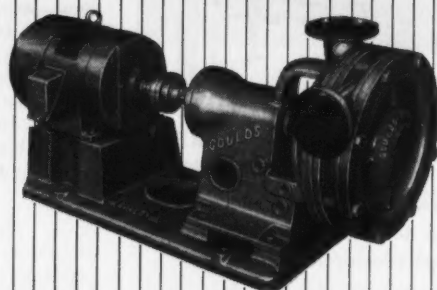
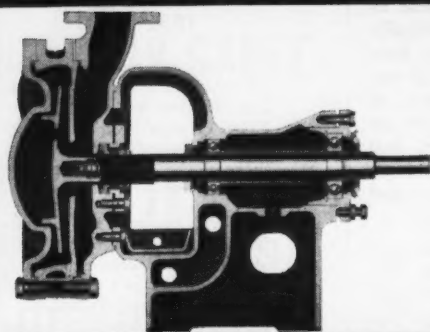
**3. Freedom from contamination.** Since the glass used in this pump is completely inert, the pumpage cannot "pick up" metallic or other substances which might contaminate or catalyze your reactions. Smoother than the most highly polished metals, the glassed surfaces of the Goulds-Pfaudler pump discourage product adhesion and scale build-up.

**4. Mechanical strength.** Goulds-Pfaudler glassed pumps are strong and durable. High temperature firings fuse the special formula glass to the metal chemically and physically, providing a permanent

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glassed pumps

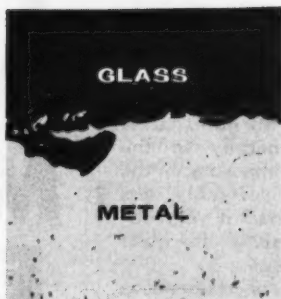


## answer to your corrosive pumping problems



glass-to-metal bond.

The resulting combination withstands sudden temperature changes within a range of 100° F. differential—and has the durability you expect from a conventional metal pump—plus remarkable resistance to corrosion.



**5. Simple centrifugal design.** The glassed pump is conventional in its hydraulic design. There are no special problems of specification, installation, or maintenance. The casing design allows internal inspection, impeller and mechanical seal removal without disturbing piping connections.

**6. Economy.** The comparatively low cost of glass and the economy of the Goulds-Pfaudler production method combine to make these pumps less expensive than others using special materials and methods to achieve any reasonable measure of resistance to corrosion.

The first cost of a Goulds-Pfaudler glassed pump is likely to be less than you expect. The *total* cost—considering improved pumping efficiency, longer pump life, and uncontaminated process—is almost certain to be lower than any you have known in the past.

**Size . . . capacity . . . head.** You can choose from four different sizes of the Goulds-Pfaudler glassed pumps, and get capacities up to 700 GPM . . . heads up to 140 ft. The pumps are available for export.

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directed toward using technology developed in other countries, they now are in a good position to take the lead in a number of areas.

**Q — What is the greatest problem of the Soviet chemical industry?**

**A —** Many of their problems are not peculiar to the Soviet economy. Some that are peculiar to their economy are: a) Greater utilization of basic research, their own as well as that reported in published form. Successful training of engineers is only one aspect of this problem. In other aspects of the problem the success has been achieved in greatly varying degrees and the outlook for successful application of research is by no means uniform throughout the entire industrial field. There is a constant and unyielding demand by responsible leaders of research and industry for speedier development of new processes and products.

There are numerous examples of opportunities offered by Soviet research but not seized by Soviet industry. Official dogmatism, stifling the individual initiative in the USSR, carries a large part of responsibility for this situation.

b) The second problem is also common to all of the Soviet industry — that of volume. There is a tremendous pressure to meet the goals set up for each plant, for each industry. The people involved are constantly prodded to meet these goals and are rewarded for doing so.

c) A third, but by no means least, problem is distribution of the production between capital and consumer goods. The need to satisfy the consumer is getting more imperative.

**Q — How is new research generated in the Soviet chemical industry?**

**A —** New basic research is planned in Russia in about the same manner as production is planned. The Soviet Academy of Sciences has control of research, although there are several layers of operation. The basic research is kept in the hands of the Academy itself. The applied

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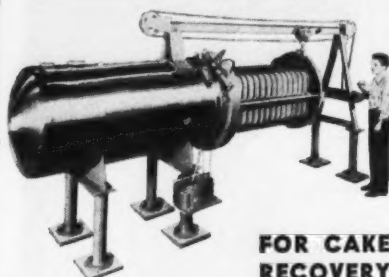
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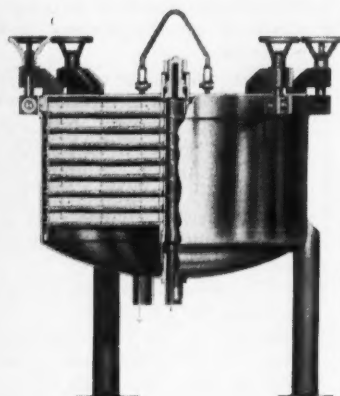
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and CENTRIFUGAL EXTRACTION

research is handled by the next layer, the research institutes of the specific industries. For example, there is an Aniline Dye Institute, a Nitrogen Institute, and so on.

Then, in every big plant there is a lab for work related to that specific plant. They aren't called upon to do any broad work for the industry, but occasionally they will hit upon something worthwhile and will publish it for the use of the industry. For the most part, though, it might be thought of as a technical service lab.

**Q — Is the Soviet chemical industry "modern" as we apply the term to our industry? Do they replace equipment as soon as it is economically feasible to do so, or do they let it run as long as it will operate? I'm speaking not of their vital industries such as missile fuels or atomics, but of the basic products such as sulfuric acid, soda ash, and such.**

**A —** The Russian chemical plants are modern, or not, depending on where you look. In what they call their "responsible" industries — missile fuels, much of the oil refining industry — their plants and facilities are as modern as they can possibly be, having the most modern lab equipment, the most modern instrumentation. The plants, in fact, are over-instrumented in some cases. In other cases, of course, generally in the fields of less importance, the plants are considerably less than modern. Use of very obsolete equipment is also quite common.

Since 1950 a tremendous amount of renovation and reconstruction has been going on in the industry, and most of the installations built since then have been what we would consider very up-to-date indeed. Probably 90 percent of the plants operating now have been built since 1917.

**Q — Are Russian chemical products generally of as high quality as those from our own industry?**

**A —** With the exception of products vital to the defense efforts and to the general industrial good, Russian chemi-

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CHEMICAL PROCESSING





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APRIL 1958

cals — particularly such things as synthetic rubber, plastics, fibers, and other consumer goods — are generally of poorer quality than similar goods produced in this country. Production of first-class material requires better equipment, better control, more and closer inspection. All of these require time and effort which are largely committed to produce goods and defense. However, they can and do produce materials, not only chemicals but in other fields, that are of top quality.

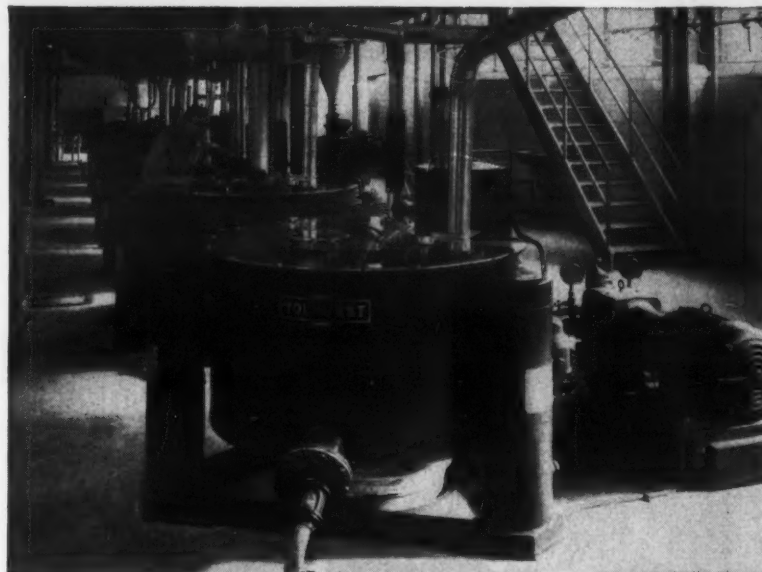
**Q — How about the Soviet production reports and Russian statistics in general? Can we believe them?**

**A —** Yes, Russian statistics should be regarded generally reliable. Here's why: As I explained before, Soviet industry works to the most detailed schedules and plans. Accordingly, very detailed production records are kept. These records are so complex that it would be impossible to keep two sets of books.

Of course, because of the distribution patterns in the USSR, the statistics don't always reflect the actual conditions in the economy. Take, for example, the plastics production I mentioned above. One would assume from the relatively great amount of plastic produced that every Russian housewife is using a plastic dishpan and buying food in plastic containers. But, of course, they're not at all. So, you see, although we can believe their statistics, we must be careful about what conclusions we draw from them.

**Q — Do the Russians have a patent system? How does it work and what is its purpose?**

**A —** Indeed they do have a patent system, but it doesn't attempt to do the same job that our system does. They really have no need for the type of protection our system affords. When a Soviet inventor develops something he wants to patent, he must first describe his invention and gain the approval of the Committee of Inventions attached to the Council of Ministers of the USSR. They may then issue an Authorship Certificate to him. The invention



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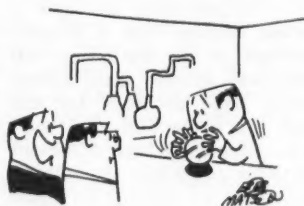
is automatically assigned to the institution where he works. And he'll get quite a sizable remuneration for it if it has specific application. If it is not applied, he gets nothing. Actually, his pay for its development is computed from the amount of money it will save, pretty much like our own employee suggestion systems. In 1956, the number of disclosures approved for industrial use was about 1.6 million.

**Q — Where do the Russians stand with processing equipment?**

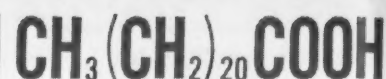
**A —** Before World War II the Soviets imported large amounts of processing equipment; however, their policy has always been to produce as much of their own as possible. Consequently, they have made great efforts to gain experience in its manufacture. They have bought licenses when necessary, and in some cases have bought foreign equipment and modified it for their own uses. Now they are in a position to produce all of their own equipment and are making important contributions to its design. Nevertheless, they do not spend time to develop new equipment for important plants when the production can be accelerated by a purchase abroad.

**Q — Is the Soviet transportation system ample to serve the industry's needs?**

**A —** No. Although there is a considerable modernization going on all the time, the bulk of the Soviet transportation



"I could laugh it off . . .  
but he always comes up  
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CHEMICAL PROCESSING

facilities are the railroads: 83 percent (in 1955) against some 42 percent in the United States. About half of the Soviet railroads were built before the revolution (1917) and were intended to serve a transportation pattern quite different from the Soviet pattern of today. With a total industrial output between one-half and one-third of that of the United States, the USSR has a similar average length of railroad haul and a higher volume of freight traffic. The rapid industrial development requires more transportation than can be built to synchronize the two. Furthermore, the location of new industrial centers in previously underdeveloped areas, which are rich in many, but not all the necessary, resources and are strategically preferable, also increases the transportation burden.

**Q — How about the Russian petrochemical industry? Is it as well developed as ours? Is there as close an association between the Soviet chemical and petroleum industries as there is between ours?**

**A —** The Soviet petrochemical industry is extremely modern and advanced. They are providing it with the most modern equipment and facilities; they are making or are readying themselves to make almost all of the materials our own industry produces. Here again is an area where the Soviets have recently concentrated on catching up with the rest of the world.

The association between the chemical and the petroleum industries in Russia is always as close as it need be for their purposes. Remember that there is no business competition and there is considerable activity in exchanging helpful information and data. This, of course, is true of all of the Russian industries.

**Q — Americans in the chemical field generally take an extreme interest in their work; they take considerable personal pleasure and satisfaction from their accomplishments. In short, their morale is very high. Is this also true of the Soviet chemical industry?**

**A —** More so! The morale in



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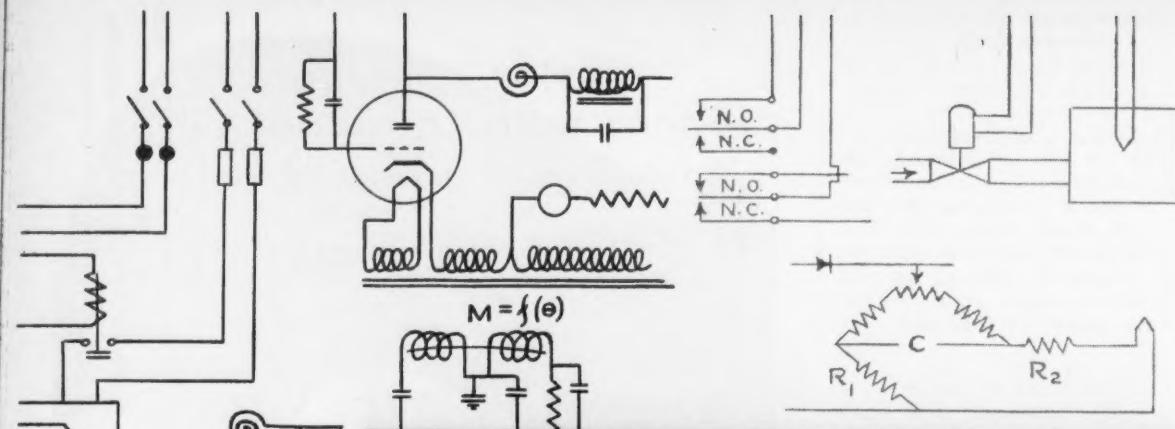
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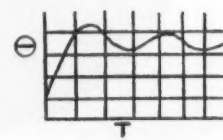
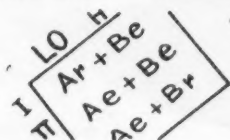
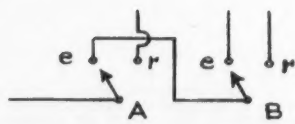
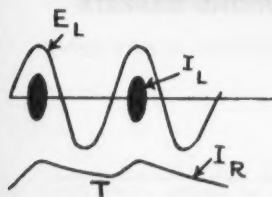
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the Soviet chemical industry is extremely high. You must remember that within the Russian society the Soviet scientist or engineer lives much better than most of the other people and, indeed, is living much better himself than he ever was in the years after the revolution. He is well paid; he has tremendous prestige. He is given extra remuneration for his own inventions, he receives additional pay for writing a paper. He is told, and for the most part believes, that he is an owner of his industry.

This is more true of the engineer or worker who has little or no communication with the outside world. For those in positions which require communication with foreign countries, the morale problem becomes more difficult. Also in past Russian history, throughout the 19th century, large-scale foreign contacts have undermined the morale among officers of the Russian army and other supporters of the Russian regime. Although he knows that he is much better off than his father was, the Russian worker can begin to see himself in relation to his counterparts in the Free World. Therefore, the government is faced with the necessity of maintaining morale based on ideas, not on the basis of providing the consumer with the goods to which he is entitled and to which he knows he is entitled. This is now accomplished, only as far as intangibles go — cultural activities, schools, music, libraries — and constant propaganda. By and large, the attempts have been successful.

The Soviet chemical industry contributes very much strength to the Soviet state, but at the same time it generates, just like all other Soviet industries, a tendency toward a relaxation of the tension. With an increased sense of security and with increasing demands of the Soviet citizen for more consumer goods there may be a real need to satisfy to a much greater extent than heretofore the needs of the consumer. A more comfortable life and greater satisfaction leads to a conservative attitude.

Check 4429 opposite last page



**NEW SOLUTIONS**  
of processing problems

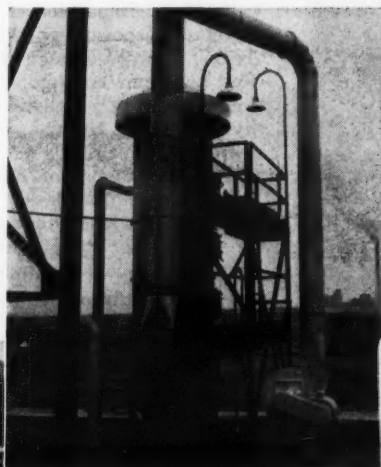
**Fig. 1 —** Ammonium sulfate drops to conveyor belt after leaving large rotary dryer

Two stainless steel dust collectors handling ammonium sulfate and adipic acid —

## SAVE \$46,000 PER YEAR IN RECOVERED PRODUCT



**Fig. 3 —** Collector used in adipic acid process at National Aniline



**Fig. 2 —** Centrifugal air washer which collects ammonium sulfate dust

**GORDON WEYERMULLER**, Associate Editor

With **C. J. PORTER**, Supervisor, Chemical Dept.

Chesterfield Plant, National Aniline Division

Allied Chemical & Dye Corporation, Hopewell, Va.

**P**ROBLEM: When the Chesterfield Plant of National Aniline started manufacturing ammonium sulfate and adipic acid, valuable product would have been lost unless a satisfactory method of recovery was devised.

**Solution:** In January 1955, plant installed two dust collectors, known as centrifugal air washers. First collector is used on ammonium sulfate process. After ammonium sulfate leaves large rotary dryer (Fig 1), it falls to belt conveyor. Dust from the conveyor and dryer is caught by the wet-type collector installed above on roof (Fig 2). Collector uses a 6500-cfm exhaust fan.

The second centrifugal air washer is used in the manufacture of adipic acid, a corrosive material. This collector (Fig 3)

is hooked up to dryer and pneumatic conveying system for product. It also uses a corrosion-resistant exhaust fan.

The collectors combine centrifugal and washing action to give high collection efficiency while removing extremely fine particles. Heavier particles are removed in lower section by centrifugal action. Finer particles are agglomerated in water and also removed by centrifugal action. All washing liquid and sludge leaves unit from one drain outlet. Cleaned gas is discharged from top of unit. Collector is made of 304 and 316 stainless steel.

Fan used with each collector employs a backward-curved blade wheel. Standard wheels are Monel but they can be furnished in other alloys. Unit is

# AVAILABLE NOW! no. 3

in the famous series of

JENKINS PRACTICAL PIPING LAYOUTS Books



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### PIPING LAYOUTS NOS. 51-75

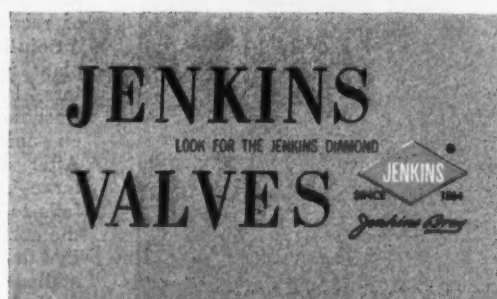
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63	Piping Connections for a Diesel Engine Lubrication Oil Purification System		

PLUS 10 PAGES OF VALVE SPECIFICATIONS

Volume 3 is a 36-page collection of 25 basic piping diagrams with complete recommendations for valve selection and location in the lines. The material has been prepared by registered consulting engineers in collaboration with the Jenkins Bros. engineering staff and leading equipment manufacturers. It supplements the two booklets released by Jenkins Bros. in past years as a service to consulting engineers, architects, contractors, specification writers and plant operation managers.

In addition to the piping diagrams, this book contains a ten-page, illustrated quick-reference specification "chart" which gives essential data on the complete line of Jenkins Valves.

For your copy, please request Volume 3, Jenkins Practical Piping Layouts on your letterhead. Write to JENKINS BROS., Room 45, 100 Park Ave., New York 17.



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## NEW SOLUTIONS

designed for low turbulence.

**Results:** Dust collection system used on adipic acid process recovers product providing an estimated saving of \$46,000 per year. Collector used on ammonium sulfate process also recovers a nominal amount of product, returned to process.

(Centrifugal air washer is product of The Ducon Co., 147 E. 2nd St., Mineola, N.Y.)

Check 4431 opposite last page.

(Corrosion-resistant fans are manufactured by Buffalo Forge Co., 490 Broadway, Buffalo, N.Y.)

Check 4432 opposite last page.

## Mechanical seals boost efficiency of pumps

Cut repacking expenses; slash leakage losses

**Problem:** Expansion of Texas Gas Corporation's Winnie, Texas, refinery created a need for 120 gpm greater output than existing high-pressure hydrocarbon charge pumps were delivering.

Three methods for meeting additional output were considered: 1) add another pump of same size; 2) purchase a large single-capacity pump to replace existing pumps; or 3) install mechanical seals on existing pumps in the hope that savings in leakage loss would result in needed capacity.

**Solution:** Mechanical seal was installed on one of the pumps on a trial basis, then on additional pumps.

**Results:** Use of the first mechanical seal, as planned, eliminated packing and throttle bushings and stopped the extreme leakage formerly occurring at these points. Tests showed flow rate of single pump was boosted 62 gpm.

The company immediately installed seals on the second charge pump. Combined output of mechanical seal-equipped pumps was increased 124 gpm — more than enough to meet the additional requirements.

In addition to big boost in hydrocarbon pumping effi-



## NEW SOLUTIONS

ciency, other benefits were realized. These were: elimination of repacking expense and downtime losses, savings in cooling water and piping, and a safer, cleaner working area around the pumps.

Appearance of working area was also enhanced because the mechanical seals eliminated the need for approximately 90% of piping formerly used. The piping had been required for cooling the stuffing boxes and for recirculating the high-pressure leakage from the throttle bushings. Now only two lines are used — one for handling cooling water to the bearing boxes, and a 1 1/4" line running between seal covers.

(Type "U" mechanical seal is product of Byron Jackson Pumps Inc., Subs. of Borg-Warner Corporation, PO Box 2017, Terminal Annex, Los Angeles 54, Calif.)

Check 4433 opposite last page.

### Valve case histories

Series of folders detail problems, solutions, and results experienced by valve manufacturers in chemical industry. "The Evidence in the Case" — Lunkenheimer Company, Box 360, Cincinnati 14, Ohio.

Check 4434 opposite last page.



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# DIAMOND

# ROLLER CHAINS

Check 4435 opposite last page

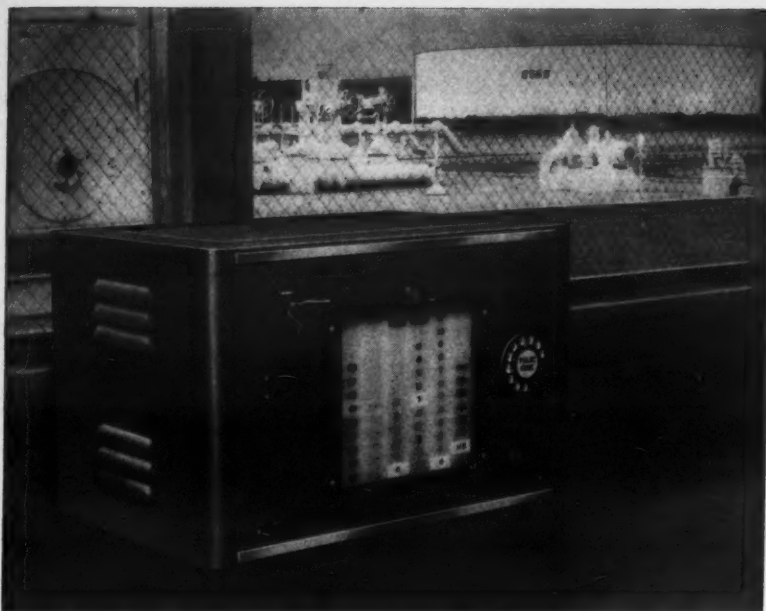


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VAREC PULSE CODE RECEIVER  
INSTALLATION AT FT. LARAMIE STA.  
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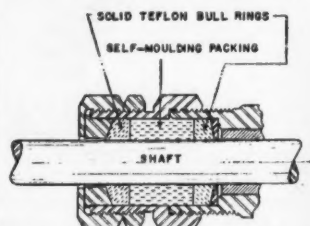
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### NEW SOLUTIONS

**Packing for corrosives  
withstands pressure,  
cuts inventory**

**Problem:** Pumps handling extremely corrosive liquids require a non-drip seal that will retain liquids without heat build-up, or shaft scoring, even with shafts somewhat worn or eccentric. For their line of chemical pumps, Eco Engineering Co. wanted an improved packing material that was progressively adjustable to successfully meet these stringent sealing requirements and do it without carrying a large stock of various packing sizes.

**Solution:** For stainless steel and Hastelloy B and C pumps, they picked a self-molding, self-lubricating, stuffing box



Pump stuffing box. Packing provides tight, non-drip seal, under pressure, in presence of corrosive liquids

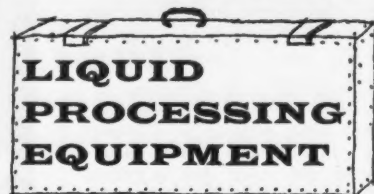
packing composed of finely divided Teflon worked into a chemically inert poly-chlorotrifluorethylene grease having excellent lubricity. Packing is confined by Teflon end rings. Material does not gel, harden, or set up with heat and can be produced in a variety of consistencies.

**Results:** Packing provides a tight non-drip seal under pressure, and in presence of such corrosives as aqueous hydrochloric, nitric, or sulfuric acid, high-test hydrogen peroxide, caustic, or alkalis. It works successfully with stuffing boxes with shafts too out-of-round to work with conventional packing and is effective over months of use.

(Fluoropak packing is a product of Halocarbon Products Corp., 82 Bulew Court, Hackensack, N. J.)

Check 4437 opposite last page.

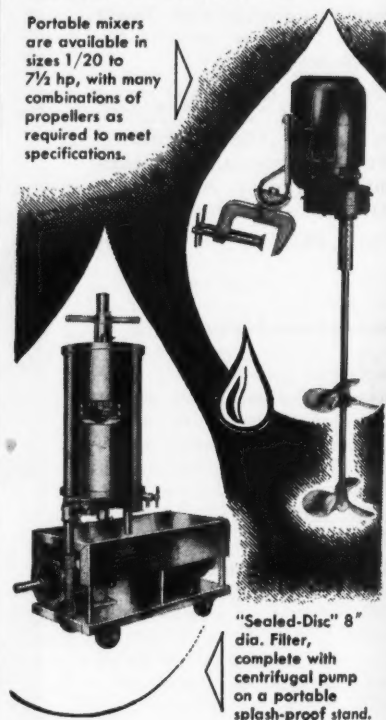
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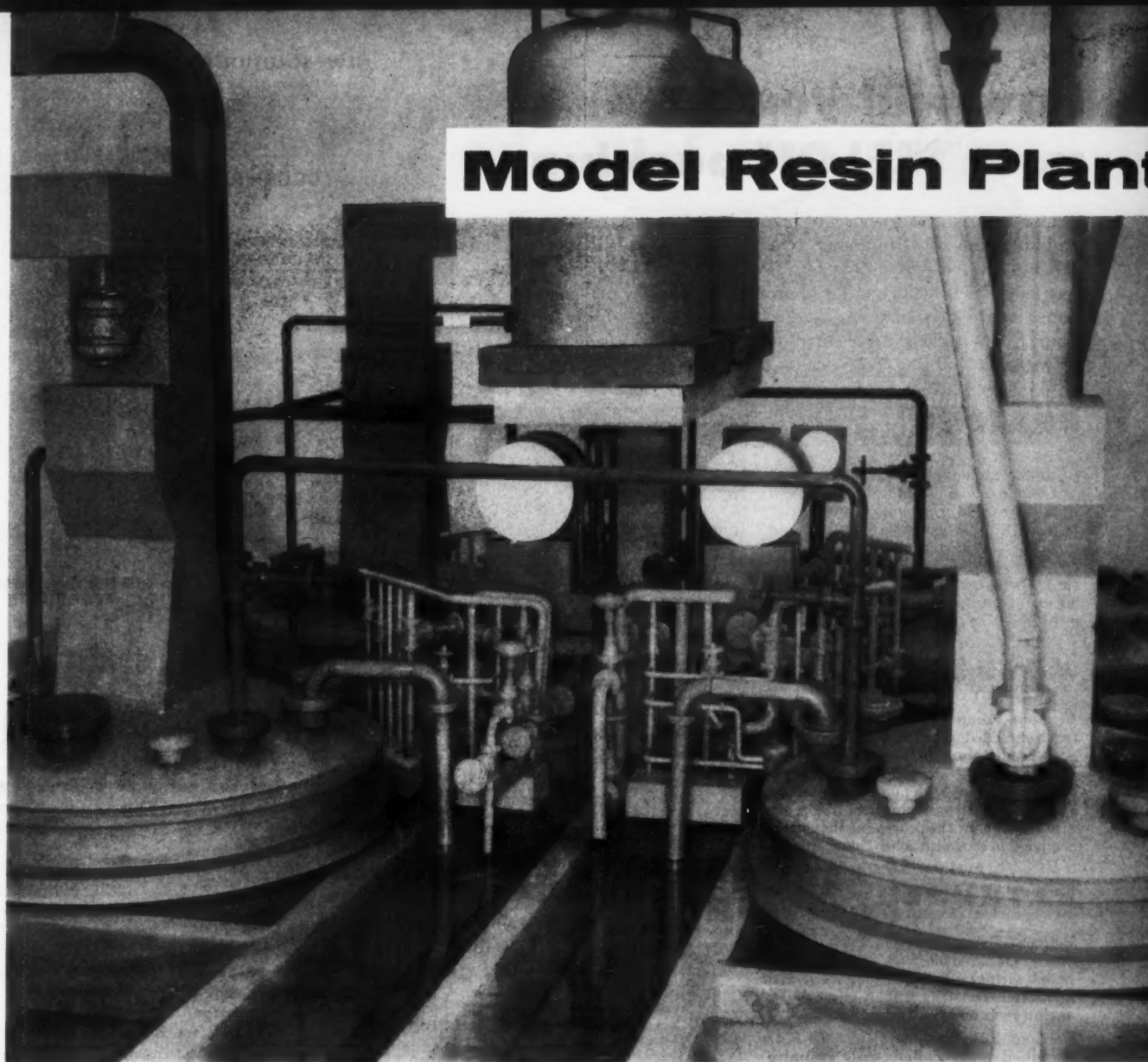
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# Model Resin Plant



**For CIBA Company, Inc.** in association with Toms River-Cincinnati Chemical Corporation, The M. W. Kellogg Company is engineering and erecting a new Araldite epoxy resin plant. The detailed model of reactors, valve manifolds, and other equipment pictured above, has long since paid for itself in developing design details and facilitating CIBA's review and approval.

Now an integral part of Kellogg's

plant engineering and construction service to industry, the building and application of scale models save time and money in many ways for both customer and contractor. Introduced by Kellogg as a design tool, these models express engineering concepts better; achieve engineering, procurement, and construction goals faster; make the route between plant planning and plant production shorter and surer.

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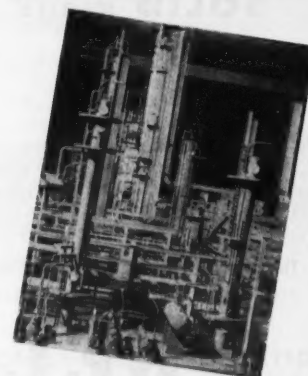
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## 12-PAGE MODEL BOOKLET



This recent issue of the Kelloggram is devoted entirely to scale models and their use as a tool for better plant design. Many examples, together with construction techniques, are discussed and illustrated in detail.

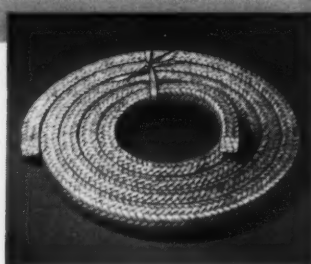


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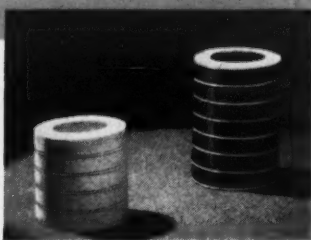
## BRAIDED

Belmont braided Teflon yarn (No. 3085) and Teflon ribbon (No. 3055) are offered with the rugged mechanical structure of Belmont's unique CRISS-CROSS Braid that will not ravel, wear through, slough off. Each strand criss-crosses diagonally through the body of the packing, becoming an integral part of the whole. Supplied in coil, reel and ring form.



## MOLDED

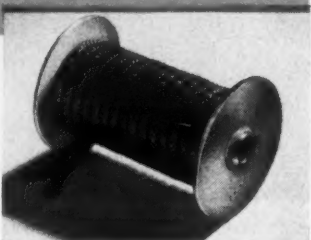
Belmont Pump Packing Rings, molded from shredded pure Teflon with Teflon suspensoid (No. 3062) and impregnated with graphite (No. 3061) serve the requirements for both non-contaminating and general purpose chemical pump service throughout the processing industries. Supplied in sets with solid Teflon spacers.



## EXTRUDED

Belmont Extruded Teflon Packing (No. 3060-C) is shredded pure Teflon, impregnated with graphite and reinforced with a skeleton jacket of Teflon yarn. Available in reels and continuous lengths.

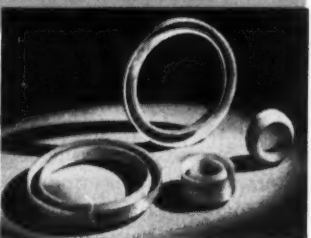
Belmont Bulk Packing (No. 3060-B) is shredded pure Teflon with graphite. Available in 1/2, 1 and 5-lb cans.



## SOLID Rings

Belmont Solid Teflon Packings are offered in 3 designs—V-Rings (No. 3105), cup and cone (No. 3115) and wedge type (No. 3115-X). All provide a tight seal at low gland pressure and minimum friction on valve stem. Offered in sets, with square end adaptors where required.

\*du Pont Trademark



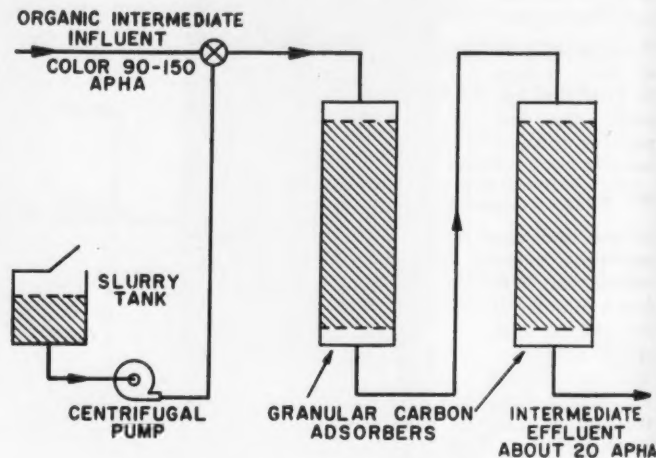
The Belmont Packing and Rubber Company • Butler & Sepviva Sts., Phila. 37, Pa.

# BELMONT

Check 4440 opposite last page

## NEW SOLUTIONS of processing problems

### SCHEMATIC FLOW SHEET ORGANIC INTERMEDIATE DECOLORIZATION



## Improve product purity with granular activated carbon

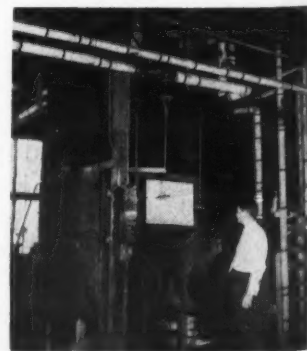
Reduces color of organic intermediate from 90-150 to about 20 APHA

GORDON WEYERMULLER  
Associate Editor

The Fords, N. J., plant of Heyden-Newport Chemical Corporation has improved the quality of an organic intermediate by continuously pumping the product through a two-bed granular activated carbon unit at about 95°C. Color has been reduced from 90-150 to about 20 APHA. Plant has also attacked the problem of handling activated carbon with a good deal of imagination—using a hydraulic system which has performed efficiently since it was placed in operation early in 1956.

Type CAL 12 x 40 mesh granular carbon is poured from 60-lb bags into an aluminum slurry tank. There it is mixed with water in a proportion of about three pounds of water per pound of carbon. Steam sparge and agitator hold carbon in suspension in the slurry tank. Slurry is transferred through a stainless steel

centrifugal pump to one of two cylindrical adsorbers shown in photo. Each adsorber is 3 1/2' in diameter by 10' on a side. Carbon falls into adsorber and is retained by an 80-mesh stainless steel screen, which allows water to be sent into sewer or back into slurry tank. Each adsorber holds about 2500 lb of carbon, which fills it to a depth of 9'. Ad-



CP Staff Photo

Two carbon adsorbers used at Heyden-Newport

sorbers, pipes, and valves are all stainless steel.

Organic intermediate flows through the two adsorbers in series. Operator can alternate which unit the organic intermediate enters first. One unit can be refilled with carbon while the other is operating. Carbon charge lasts about six months.

(Granular activated carbon is product of Pittsburgh Coke & Chemical Co., Grant Building, Pittsburgh 19, Pa.)

Check 4441 opposite last page.

**Clay pipe, PVC couplings resist corrosive wastes, help disposal solution**

Chosen as best for application at Spencer Chemical

**Problem:** No sewers were available and no treatment facilities could be constructed (because of the proximity of residential property) for the conveyance and disposal of chemical wastes from the research center of Spencer Chemical Co., in Johnson County, Kansas. Providing satisfactory facilities for the disposal of chemical wastes from the laboratories was a problem that required careful study.

**Solution:** A 300-foot, four-inch vitrified clay pipe line was laid between the laboratory building and a concrete holding tank with an acid-proof lining. A separate line and tank were also constructed for sanitary wastes. Due to the fact that no sewers are available, these tanks have to be pumped out daily and the waste hauled away by truck to a suitable disposal area. While the holding tank for sanitary wastes is intended as a temporary facility, the chemical waste tank is designed as a permanent installation for pretreatment of wastes before dumping into the city sewers when they become available.

Clay pipe with new PVC couplings was chosen as the best material to resist the corrosive chemical wastes from the laboratory. The PVC coupling consists of rings, preci-

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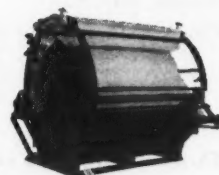
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Check 4443 opposite last page

**NEW SOLUTIONS**

sion molded and fused on the spigot and in the bell of the pipe. The polyvinyl chloride is applied to hot pipe in liquid concentricity and exact di-form and is cured at high temperatures. It bonds tightly with the glazed surface of the pipe.

A joint is completed by applying lubricant sealer to the mating surfaces of the coupling, and simply pushing the spigot firmly into the bell socket. The PVC coupling is a compression-type joint. It keeps the precision mating surfaces in tight contact with each other, and exerts a pressure on the inside of the bell



Dickey PVC coupling permanently joins lengths of vitrified clay sewer pipe. This compression-type union has sufficient flexibility to withstand normal displacement without joint failure or loss of water-tightness

and the outside of the spigot, thereby increasing the bond of the coupling with the pipe.

**Results:** Because of its resistance to acids, alkalis, and other deleterious chemicals, polyvinyl chloride coupling is perfect jointing material for durable clay pipe in handling severe industrial and chemical waste products. Exfiltration, as well as infiltration, is eliminated by the tight compression seal which is obtained with the coupling.

(Clay pipe, lubricant sealer, and PVC couplings are product of W. S. Dickey Clay Mfg. Co., Commerce Trust Bldg., Kansas City, Mo.)

Check 4444 opposite last page.

**Ship-loading time reduced by pushbutton-operated conveyor system**

Ship-loading conveyor system at Freeport Sulphur Company's loading dock along the Mississippi River, at Port

To page 80

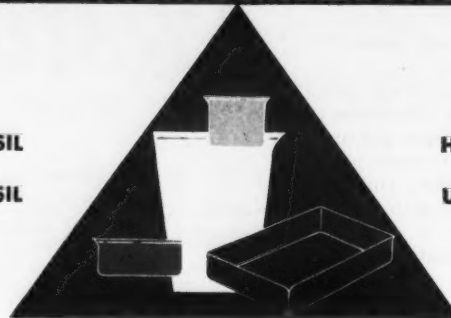
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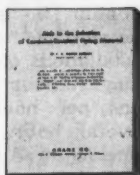
CHEMICAL PROCESSING



## PROCESS PIPING POINTERS

### Aids to Selection of Corrosion-Resisting Piping Materials"

You will combat corrosion more effectively with this 2-page technical paper at hand. It discusses questions on important related service factors that are not always obvious... shows with colored "Stop, Caution, and Go" charts the suitability of metals for more than 150 corrosive fluids, based on extensive tests and experience. Ask for publication AD-703R at no cost. See below.



### Copper-free Ni-Resist valves now regularly available

To accommodate preference of customers, Crane is now using copper-free (Type 2) Ni-Resist for regular production of these widely used, economical corrosion-resistant cast iron gate valves. Approximate composition is 20% nickel, 2% chromium and 0.5% maximum copper. Body and bonnet are Ni-Resist; trim is stainless steel. Sizes up to 12 in. Ask for Circular AD-2047R.

### Heavy, sticky emulsion shows up difference in diaphragm valves



Read how a West Coast emulsified asphalt producer tested all sorts of valves... found one diaphragm design best of all—still in service after 10 years while ordinary diaphragm valves lasted only 2 months. See next page.

For literature or data on product listed above, please contact  
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processing and engineering data

223

## Pressure drop nomographs

JAMES E. GARDNER

The Atlantic Refining Company  
Philadelphia, Pa.

These nomographs are used to calculate frictional pressure losses for turbulent fluids flowing through commercial steel pipe. Procedure consists of two short steps. First, velocity head of fluid is calculated from Figure 1; then number of velocity heads lost in pipe system is calculated by means of Figure 2 (page 81). Product of these two values is total frictional pressure drop through the system.

Figure 1 is based on following relationships:

$$\begin{aligned} V_{Hf} &\propto \frac{V^2}{D^4} \\ V_{Hpsi} &\propto V_{Hf} \times sg \\ V_{Hf} &= \frac{v^2}{2g} \quad \text{by definition} \end{aligned}$$

Figure 2 is based on the Moody' friction factor plot for clean commercial pipe, the relationship being:

$$L_{VH} = \frac{D}{f} \quad (D \text{ and } L_{VH} \text{ in same units})$$

Division of total equivalent length of pipe by the value of  $L_{VH}$  yields number of velocity heads lost, because of friction, by a fluid flowing through the pipe system. Reynolds number is

$$N_{Re} = 7730 \frac{dv}{\eta}$$

which is convenient since Figure 1 gives linear velocity  $v$ . Extrapolation of Figure 2 is not recommended.

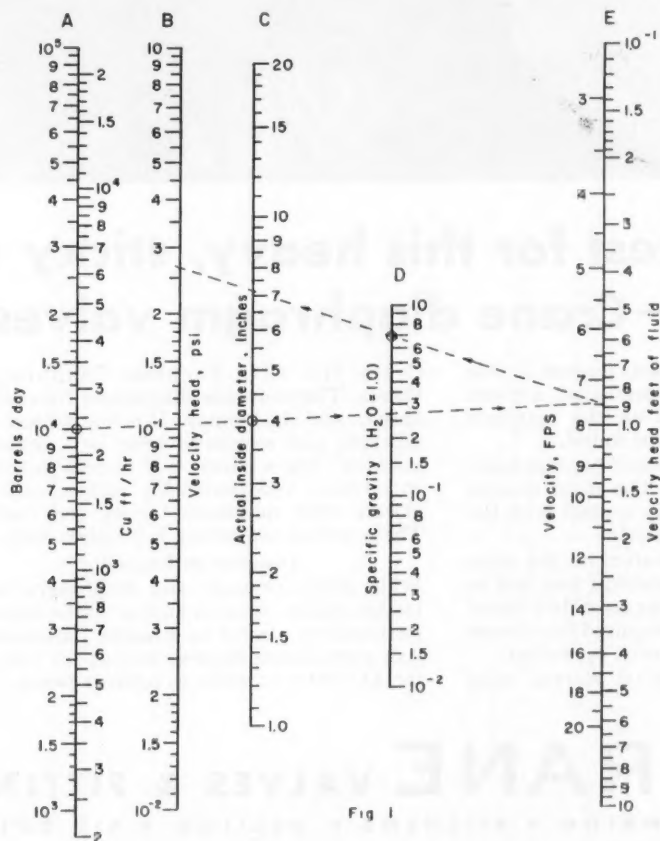


Fig 1

## Another satisfied user of Crane Diaphragm valves



### Best by test for this heavy, sticky emulsion —Crane diaphragm valves

What valve is best and lasts longest in this service? A West Coast emulsified asphalt producer tried them all on the manifold above and here's what was found.

Conventional valves would become inoperative in a short time. The main trouble was binding of the stem in contact with the cold, heavy asphalt emulsion.

Ordinary diaphragm valves on the same service lasted only two months and had to be replaced. The diaphragms didn't stand up and the high torque required for closure was impractical for frequent operation.

Three years ago the plant started using

Crane No. 1610 Packless Diaphragm Valves. The neoprene diaphragm functions only to seal the bonnet. It is not subject to crushing and excessive wear as a seating member. The separate disc in combination with Crane Y-pattern body makes positive closure with minimum torque and turns. These valves are giving full satisfaction.

#### Literature on Request

Wide choice of body and diaphragm materials makes these exclusive Crane valves particularly useful to process industries. Ask your Crane Representative for Circular AD-1942, or write to address below.



## CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Check 4448 opposite last page

## NEW SOLUTIONS

From page 78

Sulphur, Louisiana, is one of the most modern and versatile installations of its kind. Handling sulphur at rate of 1600 tons per hour, system cuts several hours off the usual time required to load ships by previous loading method. Every movement of the loading mechanism is remotely controlled by pushbuttons operated by man aboard ship.

Outstanding feature of system is its versatility, which permits adjustment of position to feed sulphur into holds at any angle and part of ship.

Here is how system works: Sulphur weighing 75 lb per cubic foot is carried to the dock by 388'-long conveyor with 48"-wide belt traveling 525 fpm. The material is transferred from the dock conveyor, by means of a tripper trailer, to a shuttle conveyor



Ship-loading time is reduced by several hours through use of versatile conveyor system controlled by pushbuttons operated by man aboard ship

running up to loading tower. Shuttle conveyor, 54" wide and 146' long, is mounted on wheels which run on track along dock. A telescopic chute is mounted on end of shuttle conveyor.

When ship is being loaded, shuttle conveyor can be moved to any position along dock so that sulphur is easily loaded. The conveyor boom can be moved up and down to compensate for the water level and size of ship. Trimmer chute rotates in a complete circle to fill the holds evenly.

(Ship-loading conveyor system was designed and manufactured by Hewitt-Robins, Inc., 666 Glenbrook Road, Stamford, Conn.)

Check 4449 opposite last page.

CHEMICAL PROCESSING

# NEW CHEMINEER AGITATOR KIT CONTROLS MIXING VARIABLES

In scale-up, this complete laboratory experimental agitator kit provides everything you need to make fast, accurate determinations of mixing requirements; use it as a flexible component in bench scale processes. All variables are under your control, and the illustrated handbook supplied makes it easy to specify or set up the correct agitation characteristics.

Full-scale geometric, kinematic, and dynamic similarities of Newtonian and non-Newtonian fluids are duplicated in Model ELB kit pilot plant and bench scale-up tests.

Contained in a sturdy, portable case, Model ELB features a constant speed 1/4 hp. motor with a micrometer controlled variable speed transmission. Linear dial-speed relationship gives 0 to 1100 rpm, with low speed torque multiplication. Also included are 22 calibrated impellers, 3 shafts, and universal mounting.

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See our industrial equipment in CEC. Complete catalog on request.

**CHEMINEER, Inc.**

Fluid Mixing Engineers

1044 East First Street, Dayton 2, Ohio

Phone BALDwin 2-8361

Check 4450 opposite last page

APRIL 1958



## processing and engineering data

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### Pressure drop nomographs — From page 79

Other uses of Figure 1 are in choosing the proper diameter of pipe to give a certain linear velocity and in calculating velocity heads for expansion and contraction losses.

#### Typical Example

Find the velocity, velocity head in feet of fluid, and the velocity head in pounds per square inch for 10,000 forty-two-gallon barrels per day of fluid with a specific gravity of 0.7 flowing through a 4-inch ID pipe. Reading the scales of Figure 1 in the order of A-C-E, the velocity is 7.5 ft/sec and  $VH_{ft}$  is 0.88 ft. Reading the scales in the order of E-D-B,  $VH_{psi}$  is 0.27 psi.

What would be the total frictional pressure drop if this fluid had a viscosity of 10 centipoises (14.3 centistokes) and pipe system had a total equivalent length of 2000 ft?

$$N_{Re} = 7730 \frac{d_v}{\eta} = \frac{7730(4)7.5}{14.3} = 16,200$$

At  $N_{Re} = 16,200$  (scale A, Figure 2) and an inside diameter of 4 inches (scale B), the length of pipe per velocity head of pressure drop is 11.6 ft (scale C). Total pressure drop is

$$0.27_{psi} \left( \frac{2000 \text{ ft}}{11.6 \text{ ft}} \right) = 46.5_{psi}$$

#### NOMENCLATURE

- d = inside diameter of pipe, inches
- D = inside diameter of pipe, in general
- f = Moody friction factor
- g = gravitational constant, 32 ft/sec<sup>2</sup>
- $\eta$  = kinematic viscosity, centistokes
- $L_{VH}$  = length of pipe through which fluid pressure drop is equal to one velocity head
- $N_{Re}$  = Reynolds number

- s g = specific gravity
- v = velocity, ft/sec
- V = volumetric flow rate, in general
- $VH_{ft}$  = velocity head, feet of fluid
- $VH_{psi}$  = velocity head, pounds per square inch

#### LITERATURE REFERENCE

- 1) MOODY, LEWIS, Trans. ASME, 66, 671 (1944)

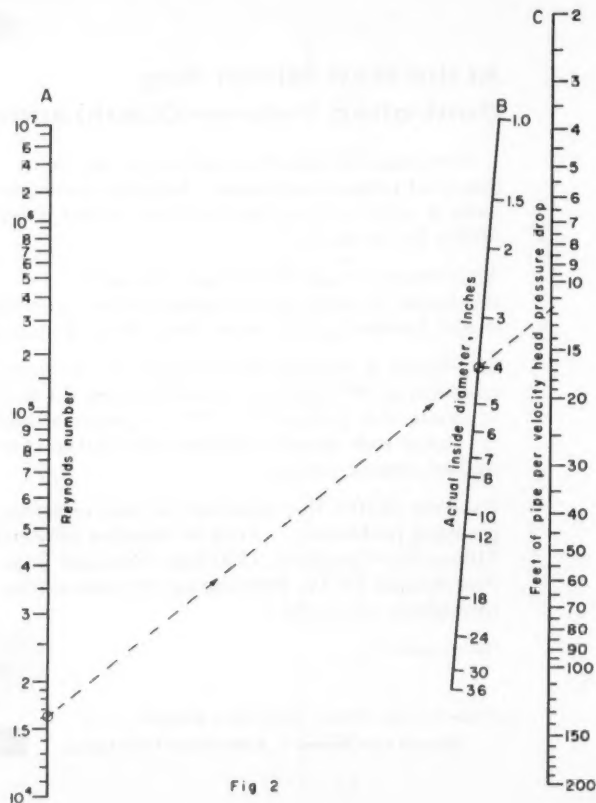


Fig 2



## NEW SOLUTIONS

### Develop plastic panels to withstand corrosion of chemical fumes

No lost production time

High concentrations of ammonia and sulphuric acid fumes above fertilizer mixing units at Olin Mathieson Chemical Corporation's fertilizer plant, North Little Rock, Arkansas, had necessitated regular replacement of conventional roofing and siding panels about every 2½ years. This resulted in high labor costs and unnecessary lost production time.

Over three years ago, a test installation was made using structural plastic panels of a special formulation of polyester resin, glass-fiber reinforced, that is highly resistant to corrosion. Before installing panels, engineers at Olin Mathieson tested samples of the panels along with other conventional roofing materials in a 3% solution of sulphuric acid for three months.

The test showed little or no structural changes in the plastic panels, whereas the best of the conventional materials lasted only two weeks. After more than three years of service in the highly corrosive atmosphere, plant's maintenance and construction superintendent reports that the plastic panels seem to be as good as when they were installed. They are expected to give at least five more years of maintenance-free service.

("Metal Grey" plastic panels are development of Resolite Corporation, Zelienople, Pa.)

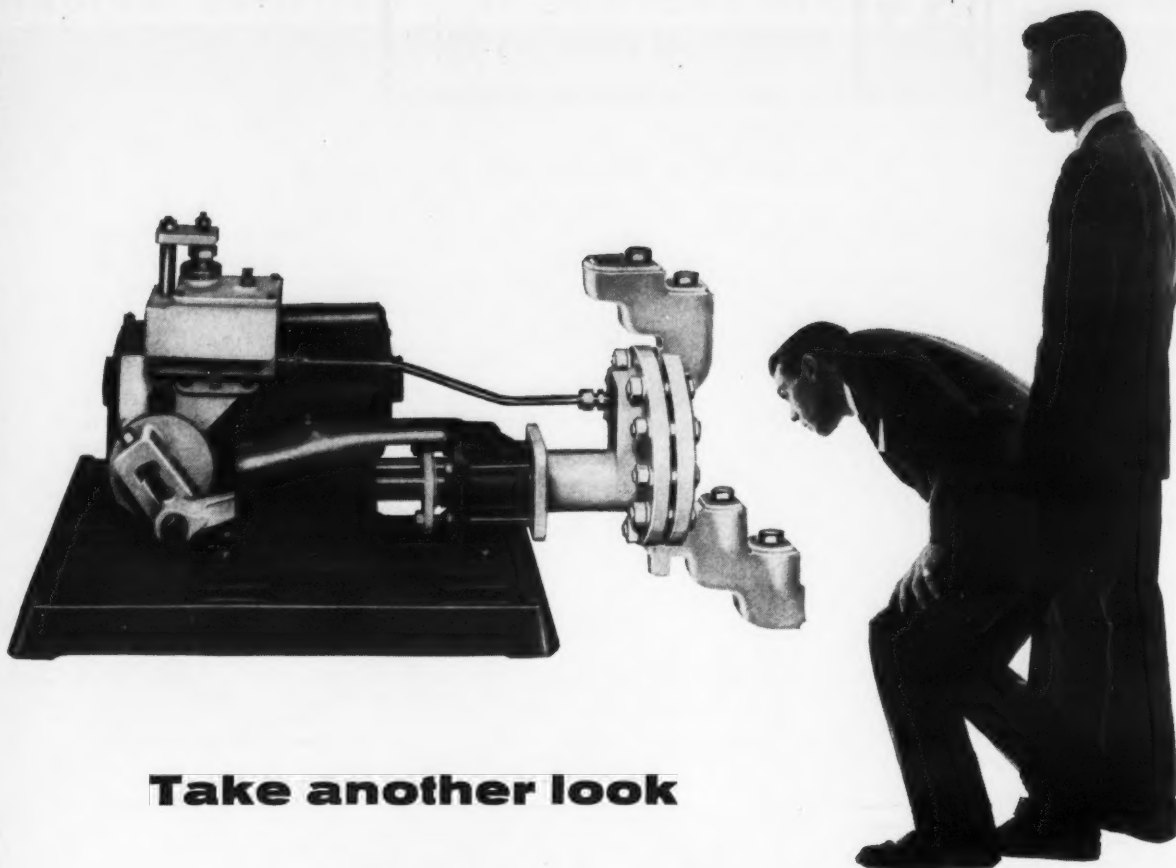
Check 4452 opposite last page.

### Sulfur 'bloom' stopped in rubber processing, 'tack' maintained

Insoluble material will not migrate in formulation

**Problem:** "Tack" is important in building step of tire manufacture. At Goodyear Tire & Rubber Co., Akron, Ohio, sulfur in rubber used for white sidewall stocks

To page 83



## Take another look

### At the New Milton Roy Controlled Volume Diaphragm Pump\*

... For chemical metering applications requiring leakproof pump construction. Available as complete new units or in kit form to convert existing packed-plunger Milton Roy pumps.

Air binding in these diaphragm pumps is eliminated by positive mechanical action, once each stroke, to bleed air or vapor from the hydraulic fluid.

Step-Valve or column valve designs are available for pressures to 1000 psi and capacities from 1.1 to 138 GPH ... manual or automatic 0-100% capacity adjustment ... liquid ends interchangeable with Milton Roy packed-plunger pumps.

Take the Milton Roy approach to your metering and pumping problems ... write for detailed information to Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives throughout the world.

\*Patent applied for.

Controlled Volume Pumps • Quantichem Analyzers  
Chemical Feed Systems • Anders Air and Gas Dryers



Check 4451 opposite last page

**STOP**  
material waste  
**REDUCE**  
handling costs  
**IMPROVE**  
product quality



with a  
designed-to-  
your-need

*Marietta*  
storage  
system

Why let inefficient  
storage and  
handling of bulk  
materials slow up  
your operation ...  
cause costly waste  
... rob you of  
profits?



Let Marietta design and erect an  
efficient and economical storage  
system for your needs. Marietta  
concrete silos are quickly con-  
structed without weather or ma-  
terial delays. Precast solid or  
lightweight air-cell concrete  
staves interlock to form an air-  
tight wall that keeps material  
stored fresh and dry ... safe  
from weather or fire damage.

Marietta concrete silos provide  
years of service with minimum  
maintenance ... save money  
through reduced insurance costs.

Any type of mechanical or pneu-  
matic conveyors, feeders or dis-  
charge systems can be safely  
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walls of Marietta silos. Consult  
with Marietta now for the best  
answer to your particular storage  
problems ... benefit by their  
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Nashville, Tenn.,  
Jamestown, N.Y.



processing and engineering data

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## Hydraulic horsepower of centrifugal pumps

W. D. STEVENS

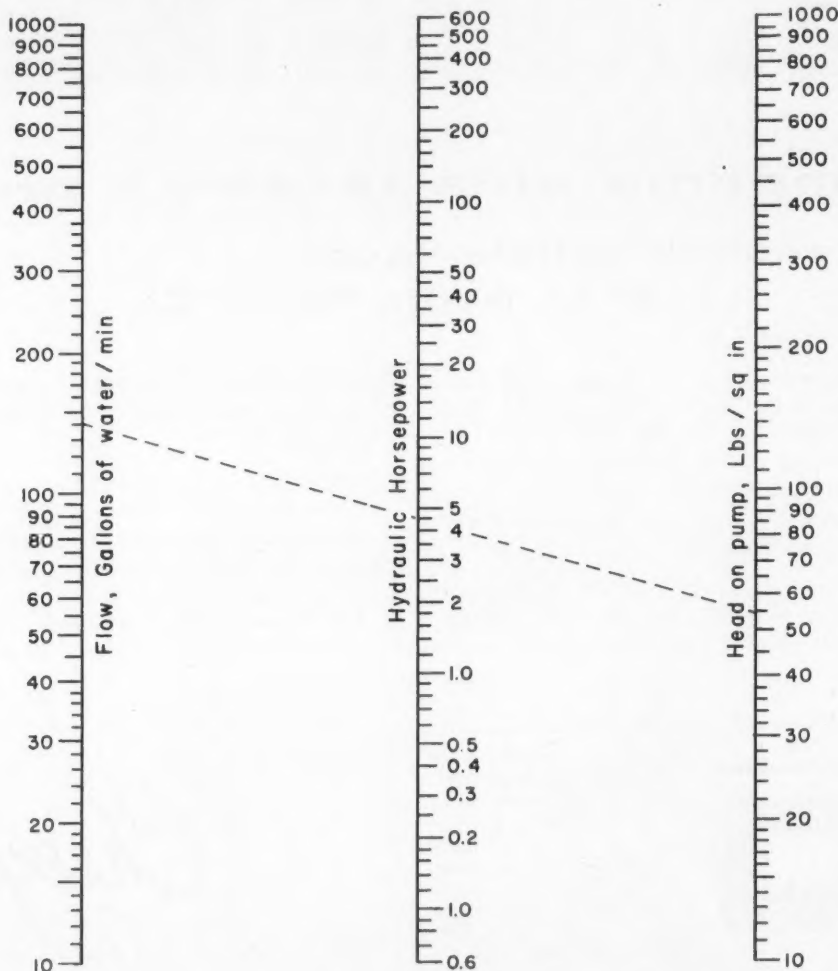
Process Engineer  
D-X Sunray Oil Company  
Tulsa 2, Okla.

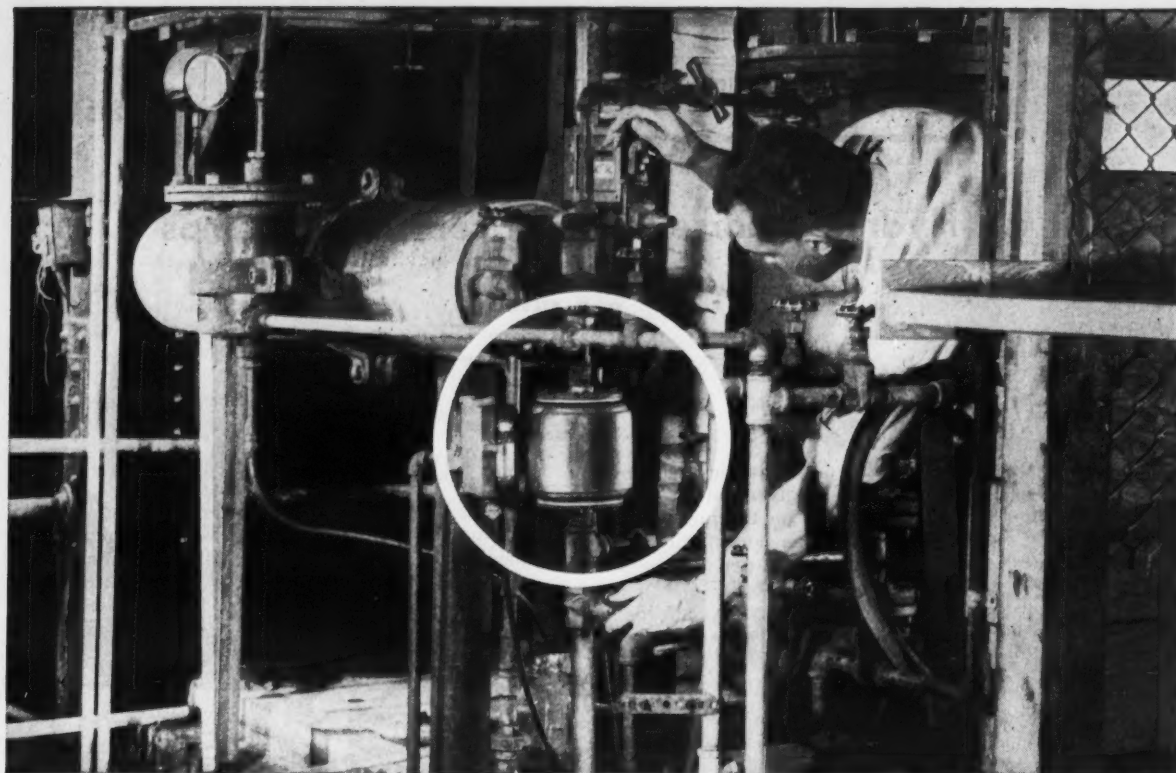
To find theoretical or hydraulic horsepower  
for centrifugal pumps at given rate of flow of  
water and a known head on the pump, multi-  
ply rate of flow in gallons per minute (gpm)  
by the pressure in pounds per square inch  
(psi) and divide the product by 1714.

The accompanying nomograph affords an  
easy method for finding hydraulic horsepower  
by this relationship.

### TYPICAL EXAMPLE

What is hydraulic horsepower of centrifugal  
pump when water flow rate is 140 gpm and  
pressure is 55 psi? Connect 140 on flow scale  
with 55 on head (pressure) scale with a  
straight line. Read hydraulic horsepower on  
central scale as 4.5.





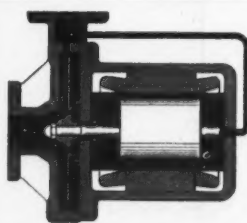
## Chempump aids research program handling sulfate liquor at St. Regis Paper Co.

Hot, black sulfate liquor is pumped into experimental digesters by this *Chempump* at St. Regis Paper Company's plant at Tacoma, Washington. Unlike conventional pumps, the *Chempump* is leakproof and virtually maintenance free . . . features that eliminate downtime and help speed the company's research program.

This *Chempump* can't leak, for it is a totally enclosed unit—no seals, no stuffing box, no packing. External lubrication is never required, as bearings are con-

stantly lubricated by the pumped fluid itself. Extremely compact, the *Chempump* mounts right in the pipeline.

Where you require dependable, leakproof pumping, put a *Chempump* on the job. You'll profit considerably from its many advantages. For details concerning your specific application, write to Chempump Corporation, 1300 E. Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



*Chempump* combines pump and motor in a single, leakproof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

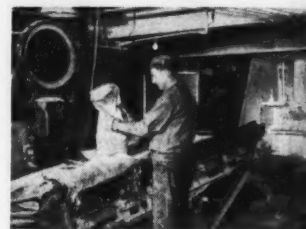
*Chempump*

First in the field...process proved

## NEW SOLUTIONS

would "bloom" to the surface after a short storage period. When this happened, rubber lost its tack (or stickiness) and tire builders laying up plies on the building drum would often find it necessary to use adhesive to hold layers in proper position for further processing.

Whenever rubber stock had to be held in storage between



Insoluble sulfur which prevents "bloom" in rubber stock can be added as part of regular formulation being weighed here for Banbury mixer

compounding and use, "blooming" sulfur complicated further processing. Labor costs were higher when stock would not hold in position without additional treatment.

**Solution:** Goodyear began using a commercially pure (99.5% plus) sulfur which contains 85% or more of an insoluble form of sulfur. This allotropic form, known as amorphous sulfur, is completely insoluble in all known solvents. Insoluble sulfur is actually a stable form of "elastic sulfur", a thermoplastic material which was a laboratory curiosity for many years.

Sulfur was added to both synthetic and natural rubbers at concentration of  $2 \pm \frac{1}{2}\%$  by weight. Material has low thermal and electrical con-

### SPECIFICATIONS

Purity (% min)	99.5
Moisture (% max)	0.25
Ash (% max)	0.15
Specific gravity	1.95

ductivity and high fungicidal properties.

In agglomerated state, 80% will pass through a No. 325 mesh sieve.

**Results:** Insoluble sulfur will not migrate in rubber

Check 4454 opposite last page



## NEW SOLUTIONS

formulation and therefore will not "bloom" to the surface. Stock retains its tack and can be built without special handling or treatment. Another important feature of non-blooming characteristic is its adaptability in producing colored and other quality-appearance stocks. In addition, fine particle size of material eases dispersing and scorch (premature cure) is prevented.

(Crystex insoluble sulfur is a product of Stauffer Chemical Co., 380 Madison Avenue, New York 17, N. Y.)

Check 4455 opposite last page.

### Radioactive waste

Summary of procedures and government directives concerning disposal of radioactive waste materials is contained in 15-page report. Compiled by the US Army Chemical Corps, report also reviews waste disposal studies and procedures of the AEC. To obtain PB 131085, "Special Report; A Survey of Radioactive Waste Disposal (U)", remit 50c direct to Office of Technical Services, United States Dept. of Commerce, Washington 25, D. C.



"Just at first glance we think we may have chanced on something rather good in an adhesive."

Our thanks to Tom Blakley, Florida East Coast Fertilizer Co., Homestead, Florida.

NO LEAKAGE  
NO PRIME LOSS  
NO CONTAMINATION  
NO STUFFING BOX

# End Liquid Metering Problems

with a  
**Lapp  
PULSAFEEDER**  
CONTROLLED-VOLUME  
CHEMICAL PUMP

### WRITE FOR BULLETIN 440

with typical applications, flow charts, description and specification of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Division, 559 Poplar Street, Le Roy, N. Y.

● Precise metering, pumping, proportioning and feeding of hard-to-handle chemicals is the specialty of the Lapp PULSAFEEDER. Designed for accurate handling of corrosive and non-corrosive liquids, it is a combination piston-diaphragm pump... providing positive displacement with *no stuffing box*. Leakage or contamination of the liquid being pumped is prevented by a hydraulically balanced diaphragm isolating the liquid from the pump's drive mechanism. All pump parts contacting liquid are of special corrosion-resistant materials. Pumping speed is constant; variable flow results from variation in piston-stroke length, controlled manually by hand-wheel, or, in auto-pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable.

# Lapp

Check 4456 opposite last page

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**HP RANGE:**

½ to 50 hp

**RATIOS:**

4:1—14:1—24:1 (or 20:1)

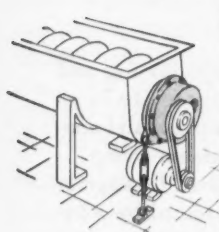
**OUTPUT SPEED RANGE:**

420 to 5 rpm

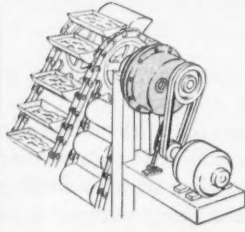
**TORQUE RATINGS:**

up to 31,500 lb-in

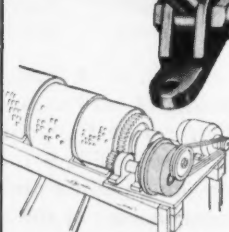
**A FEW TYPICAL APPLICATIONS**



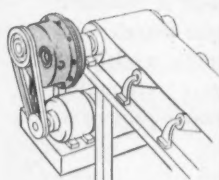
SCREW CONVEYOR



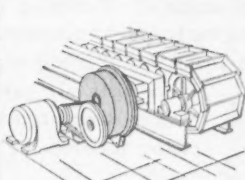
BUCKET ELEVATOR



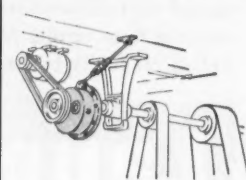
GRAVEL CLASSIFIER



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**INTERESTING**

**Cell catalyst**

A long-sought chemical that stimulates the linking of two vital life processes going on in tiny living cells has been identified by a Univ. of Wis. enzyme chemist. Two processes, phosphorylation and oxidation, are means cells use to take the energy from our foodstuffs and store it. Next step is to isolate and identify others of the "at least a dozen" more enzymes and organic molecules with which coenzyme A works.

**Atomic sutures**

Peaceful atoms are at work at Ethicon Inc., sterilizing the sutures used in surgery to close wounds. Catgut sutures are now subjected to a fast stream of electrons which kills bacteria by changing the molecular structure. Sutures are stronger, safer than when sterilized with heat, and danger of recontamination is less. (Newark News)

For more information on product at left, specify 4457 see information request blank opposite last page.



## Easy catalyst removal

### Feature of

## low-pressure polyethylene process

- Pressure centrifuges valuable in Phillips process at Celanese plant.
- Linear polyolefin of high quality produced in flexible, highly instrumented installation

GORDON WEYERMULLER, Petrochemical Editor  
With B. E. CASH, Plant Manager  
And S. T. ROSS, Production Superintendent  
Celanese Corporation of America  
Pasadena, Texas

ONE of the chief advantages found for Phillips-process, linear polyethylene plant placed on stream by Celanese in early 1957, is the ease of catalyst separation. Experience in other polyethylene plants has shown that the catalyst can become imbedded in the polyethylene and is difficult to remove. At Celanese, continuous, high-speed pressure centrifuges effectively separate the catalysts from the polymer.

Yield in the 40-million-pound-per-year plant is about 95%. Process provides flexibility, different types of polyethylene easily being made in the same equipment. High degree of instrumentation permits plant to be run with a minimum labor force. Corrosion is not a major problem since acids or highly corrosive chemicals are not used.

High-quality plastic produced

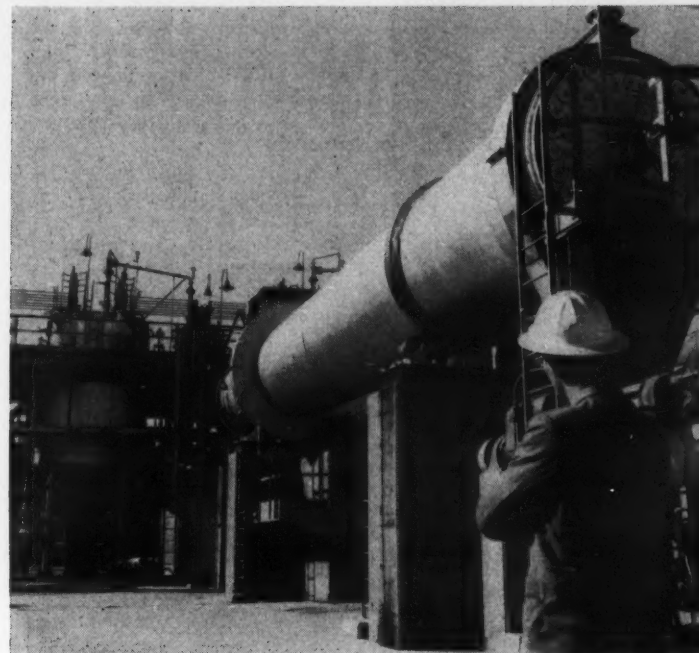
is tough and rigid and has excellent temperature resistance. It has low permeability to most gases and good corrosion resistance.

#### Process

In the process, high-purity ethylene comes to the Celanese plant through a pipeline from the Adams Terminal of Phillips Chemical Company about five miles away. Ethylene goes through a flow-control station directly to reactors.

Catalyst used is a chromium-oxide-coated material on a silica-alumina base, obtained from Davison Chemical.

Controlled amounts of the catalyst are introduced into carbon-steel reactors. Vessels are jacketed and equipped for agitation. Reaction takes place at a pressure of 20 to 40 atm and a temperature of a few hundred



Vessels where precipitation occurs are in background at left. After precipitation, polymer is dried in rotary dryer at right

degrees F. Since reaction is exothermic, heat is removed by a coolant which is pumped through jacket of vessel. Reactors operate continuously, the polyethylene polymer being removed as it is formed.

One of the important features of the process is the ease of catalyst removal. A high-pressure centrifuge, jointly developed by Phillips, and Dorr-Oliver, is used. These continuous, high-speed centrifuges operate at a pressure of 5 to 15 atm. The centrifuges in use at Celanese operate as individual units.

#### Catalyst Removal

Under centrifugal force, even the smallest particles are rapidly forced outward and continuously expelled through fixed open nozzles in the rotor. A controlled amount of concentrated solid catalyst mixed with solvent is

withdrawn through underflow and remainder is recycled to rotor. Catalyst and solvent mixture passes to solvent recovery. The solvent is recovered and the catalyst discarded.

Clear excess liquor consisting of the polymer dissolved in solvent overflows top of unit.

#### Precipitation and Drying

In the next step, polymer is precipitated out of the solvent. Solvent is then stripped from the precipitated polymer, condensed and recovered.

Polymer slurry passes into a vessel with a conical top. Polymer floats to top, goes over a weir, and passes to a large steam-tube, rotary dryer about 50-60' long, and 5-8' in diameter. Polyethylene enters dryer at about 25% volatile content and leaves containing less than 1%.

To next page



## Polyethylene process — from preceding page



CP Staff Photo  
Operator checks infrared analyzer in control room

At this point the polyethylene consists of white, finely divided particles. Some customers use the material in this form. However, most of the material is extruded. This is done in finishing area, where different lots are blended in twin-shell conical units. Color can be added here if desired before material passes to extruders. Product is bagged after it leaves extruders.

### Instrumentation

Infrared analyzer is used to determine ethylene purity going to reactors. Moisture analyzer measures  $H_2O$  in ethylene

stream. Moisture and  $O_2$  in trace quantities are poisonous to reaction. Flows, temperatures, and pressures are indicated and controlled from central control room so that essential operating conditions can be modified from one point.

### Corrosion Minimized

Corrosive conditions usually found in a chemical plant do not exist at the Celanese plant, since no acids or corrosive chemicals are handled. This gives the plant a clean, fresh, streamlined appearance and permitted use of carbon-steel for most of equipment. Exterior metal work is galvanized to guard against atmospheric corrosion.

The Phillips process has worked very well at the Celanese plant, with little downtime and minimum of maintenance. Mechanical pump seals have been a problem, mainly because of the abrasive nature of the catalyst.

Flexibility of plant permits two types of polymer to be made simultaneously. Type in larger quantity production, called Fortiflex A, has a molar weight of

around 40,000. Molar weight can be raised or lowered, as desired, by processing changes.

### High-quality Product

The low-pressure, low-temperature process produces a high-density, linear polyethylene with outstanding properties. Material called Fortiflex A is a rigid, tough thermoplastic with a softening point of  $260^\circ F$ . Gas permeability is very low. Plastic can be easily molded into a wide variety of products having good chemical resistance and a lustrous finish.

(For more information on Fortiflex A polyethylene contact Celanese Corporation of America, 180 Madison Ave., New York 16, New York.)

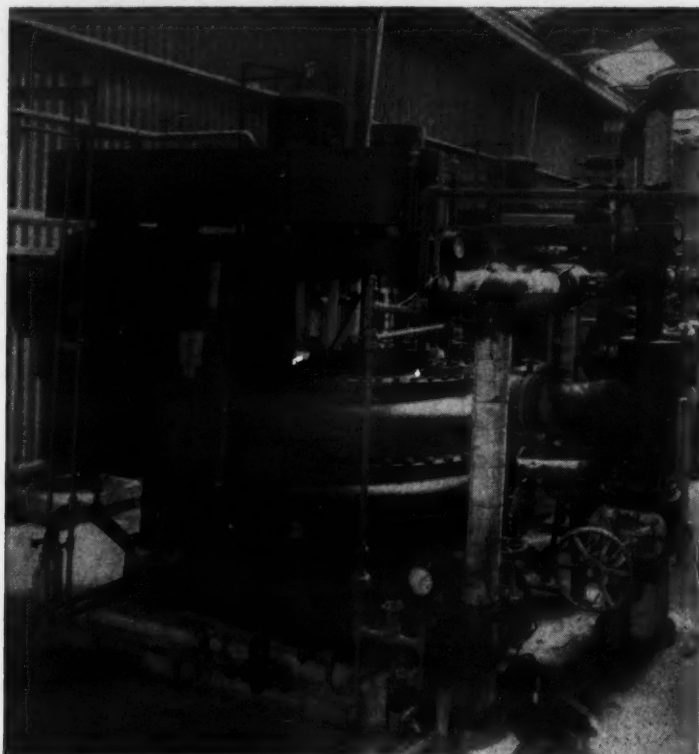
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(Merco pressure centrifuges are product of Dorr-Oliver Inc., Barry Place, Stamford, Conn.)

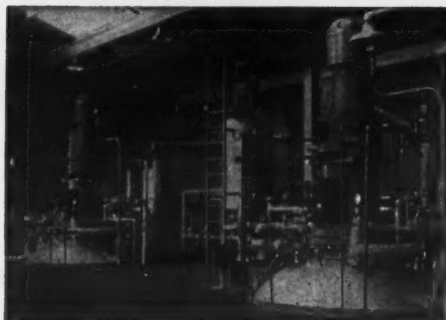
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(Rotary dryer is product of Louisville Drying Machinery Unit, General American Transportation Corp., 135 S. LaSalle St., Chicago 90, Ill.)

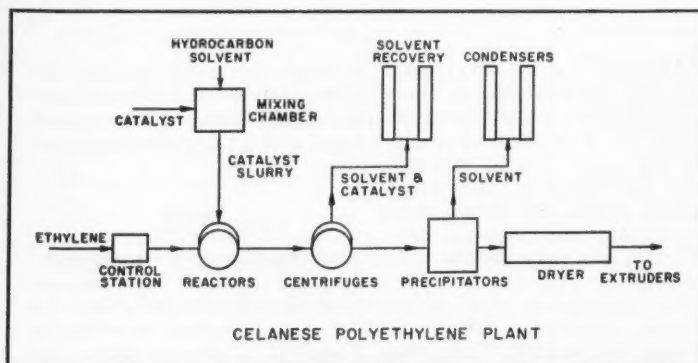
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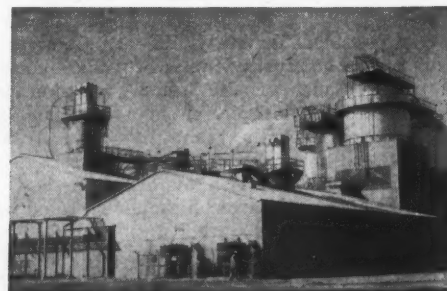
High-pressure centrifuge in operation at Celanese. Units are balanced so they can operate at high speed without vibration



CP Staff Photo  
Two of the 4000-gal reactors in service at Celanese. Each unit is equipped with agitator driven from top of vessel



Finishing area. Bins at upper right store polymer prior to blending and extrusion



CP Staff Photo

**Air-cooled heat exchanger economically handles MEA solution**

Cools 200 gpm from 160 to 120°F with 100°F air

Of major interest to petrochemical processors — especially in areas where water is scarce or costly — is the successful performance of an air-cooled monoethanolamine heat exchanger being used in a West Texas gas plant. Unit is tubed with type H/R high-finned aluminum tube.

Since going on stream in May 1954, exchanger has operated continuously, effectively, and economically in handling a heat load of four million Btu per hour. Unit cools 200 gpm of 8% MEA solution from 160-120°F with 100°F air at 3000-feet elevation. Coil design pressure is 150 psig at 250°F. Coil is six-pass and has four rows of 1"-OD x 24'-long aluminum high-finned tubes.

The high-finned aluminum tube is well suited for air-cooled operations. In this case it proved to be the most economical tube in both capital investment and maintenance. Ratio of outside to inside surface area of tube is about 8:1.

Since integral fins are squeezed directly from tube wall, the high-finned tube has a life expectancy equal to that of plain tube. Fins cannot become detached because of vibration, thermal shock, or pressure variations.

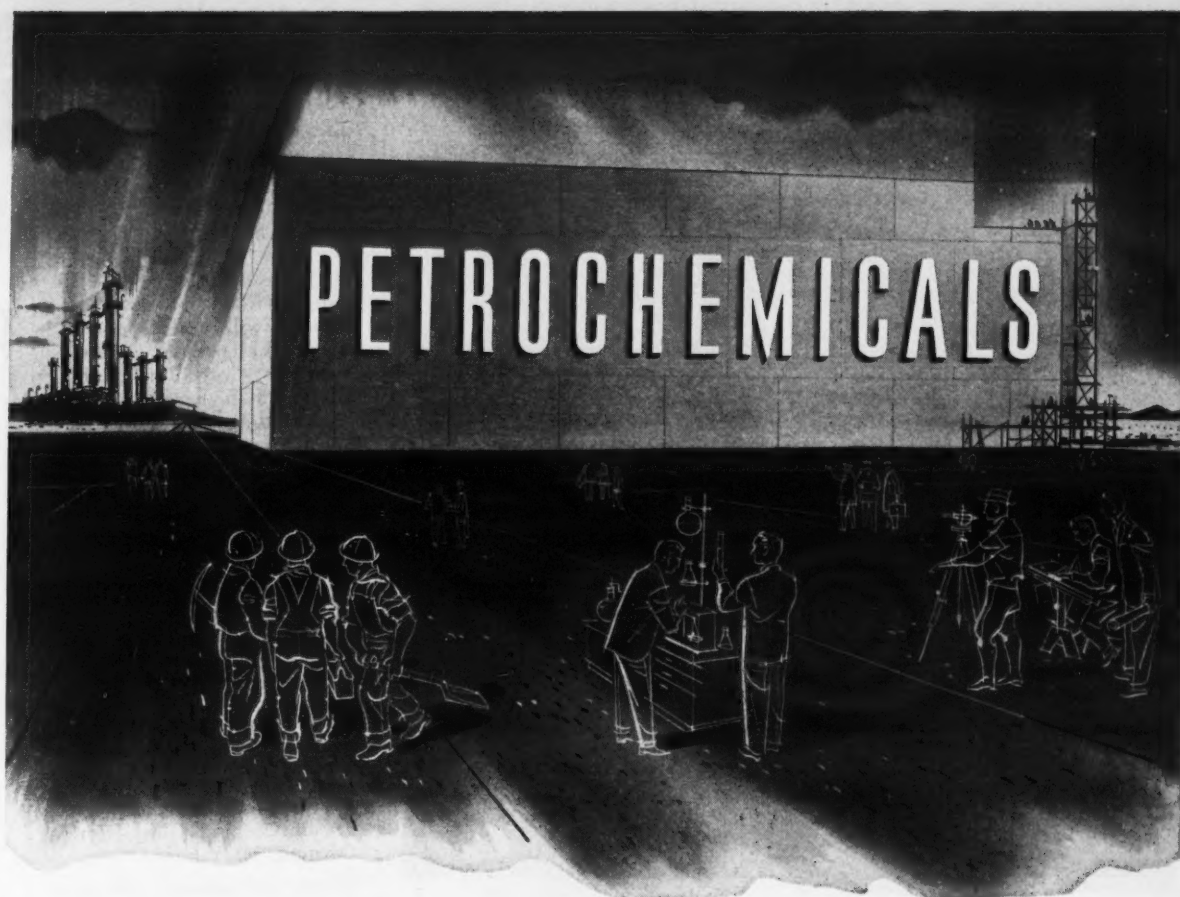
(Trufin type H/R tube is product of Wolverine Tube, div. of Calumet & Hecla, Inc., 17206 Southfield Rd., Allen Park, Mich.)

Check 4461 opposite last page.

**Control valves**

Specification sheet of four pages presents full details on manufacturer's three-way control valves. Both single- and double-seated designs for mixing or diverting service are covered. Specification S810-16 — Valve Div., Minneapolis-Honeywell Regulator Company, Fort Washington, Pa.

Check 4462 opposite last page.



## What it takes to build a new word

If your dictionary isn't the latest copy, chances are you won't find the word "Petrochemical" in it. It only got into the book a year or so ago. But a lot of time, thought and work went into its building. For many years scientists, designers and engineers in the petroleum industry have been developing the techniques for producing these important by-products that today make this word a most important one in our economy. For instance, here at UOP our research and engineering staff have been working for years, actively developing processes which yield valuable petrochemicals from

petroleum raw materials and refinery by-products. Today UOP makes available to all refiners a number of petrochemical processes. These provide chemicals for the synthetics which have become part of our daily lives through their application to so many products now essential to our standard of living. Too, they help improve the economic efficiency of petroleum refining. UOP will be glad to supply, without obligation, individual recommendations for the practical application of its various petrochemical processes to any refining operation, anywhere in the free world.

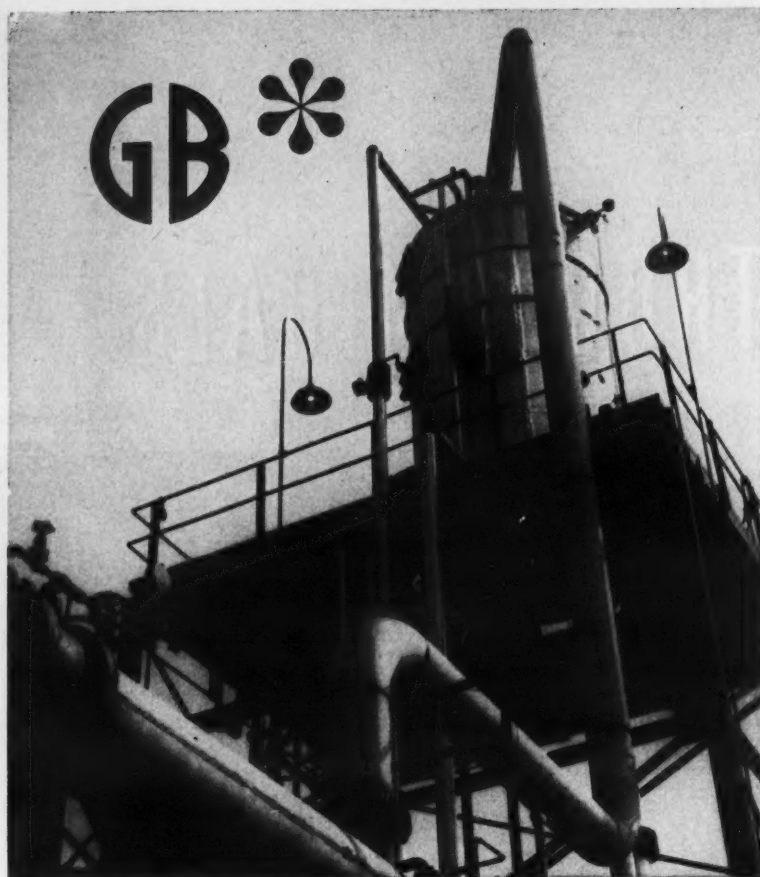


**UNIVERSAL OIL PRODUCTS COMPANY**

30 ALGONQUIN ROAD, DES PLAINES, ILLINOIS, U.S.A.

*More Than Forty Years Of Leadership In Petroleum Refining Technology*

Check 4463 opposite last page



*\* means Good Business...*

This stainless steel evaporator was especially designed for Southern Nitrogen Corporation in Savannah, Georgia. With this economical evaporator, ammonium nitrate is concentrated to 96%. This is another example of Goslin-Birmingham's ability to solve difficult processing problems by applying advanced engineering principles and modern fabrication methods and facilities.



**GOSLIN-BIRMINGHAM**  
MANUFACTURING CO., INC.  
BIRMINGHAM, ALABAMA

FILTERS • EVAPORATORS  
PROCESS EQUIPMENT  
CONTRACT MANUFACTURING  
including HEAVY CASTINGS

Check 4464 opposite last page

## PETROCHEMICALS

**Glass heat exchangers  
to have greater range  
with new tubing**

Crystalline material permits  
higher heat flow

Pyroceram-brand heat exchanger tubes recently announced will extend operating range of present glass exchangers. Crystalline tubing will permit high rates of heat flow per unit area, allow higher operating pressures, and lessen any chance of damage to unit by abrasive particles. Tubing is pure white and opaque, with the thermal shock resistance equivalent to that of fused silica. It is available in diameters ranging from  $\frac{1}{8}$  to  $\frac{3}{4}$ ", has flexural strength of 17,000-23,000 psi, specific heat of 0.240, and maximum operating temperature of 500°C under load. Thermal conductivity at 25°C is 0.0035-0.0040.

(Pyroceram tubing is product of Corning Glass Works, Corning, N. Y.)

Check 4465 opposite last page.

**Gives temperature control,  
corrosion resistance  
to reactors**

Channeled alloy-clad steel  
has built-in coils

**Uses:** For reactors requiring corrosion-resistant linings as well as thermal control in refining, petrochemical, and chemical processing fields. Number of other applications are possible.

**Features:** Faster heat transfer, close temperature control, and corrosion resistance at a nominal cost may be achieved.

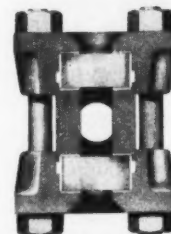
**Description:** Carbon steel base plate is channeled and then an alloy cladding is applied by the Hortonclad vacuum process. Finished clad plate has coil-like passageways for a cooling or heating medium. Cladding permits excellent corrosion resistance to be obtained with a relatively thin alloy layer. Base plate provides the needed strength.

A wide variety of stainless, nickel alloys, and other mate-

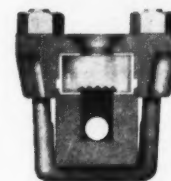
*Strahman*

## HIGH PRESSURE GAUGES

USED IN  
REFINERIES  
AND  
CHEMICAL PLANTS  
THROUGHOUT  
THE WORLD



**THRU VISION**



**REFLEX**  
Single or Multiple  
Sections

**TUBULAR**

Gauge Cocks  
Large Chamber  
Reflex Gauges  
Heated or Cooled  
Gauges

SEND FOR  
COMPLETE  
CATALOGUE

**STRAHMAN VALVES, Inc.**  
16 Hudson St., New York 13, U.S.A.

Check 4466 opposite last page  
CHEMICAL PROCESSING



## PETROCHEMICALS



### Key TO TOP QUALITY and SERVICE

#### Catalog A-7

FOR COMPLETE INFORMATION



### MAC-IRON

**BLINDS, SPACER RINGS, TEMPORARY STRAINERS, LINE STRAINERS, and PIVOT FLANGES . . .**

This comprehensive booklet is your guide to the use of specialized equipment planned and produced to function with extreme efficiency. Detailed specifications, descriptions, and data are included.

In the years of supplying to the Petro-Chemical Field MAC-IRON has developed a design and production service to a degree seldom equalled. If confronted with an emergency or tight schedule, PHONE US. If not in stock, the equipment you need will be made up at once.



Your inquiry will promptly bring a copy of Catalog A-7 or specific engineering data. PHONE MAIN 6-3712 FOR IMMEDIATE PRODUCTION OR CONSULTATION SERVICE.

**"If YOU USE PUMPS You need MAC-IRON Strainers"**



Type 405 stainless on carbon steel. Small fillets formed at vacuum bonding line eliminate crevice corrosion

materials can be used for the cladding. Occasionally, base materials other than carbon steel are used, such as copper base with titanium cladding.

(Channeled clad plate is product of Chicago Bridge & Iron Co., 332 Michigan Avenue, Chicago 4, Ill.)

Check 4468 opposite last page.

### French petrochemical growth rate indicated in capacity table

A recent compilation on its status indicates that the French petrochemical industry has donned "seven league boots." A summary of present and anticipated capacities is presented in following table:

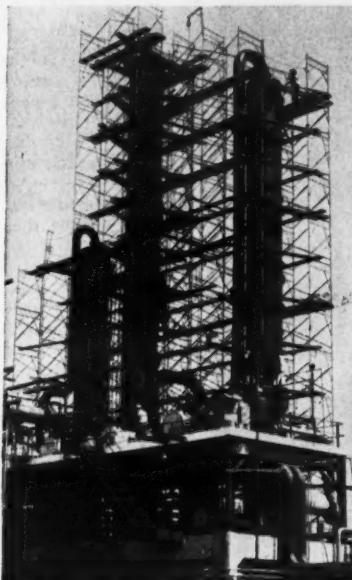
	Thousand Tons	
	1957	1960-1961
Sulfur	68	600
Ammonia	236	366
Ethylene	10	70
Ethylene oxide	8.5	17
Polyethylene	—	40
Propylene	53	85
Propylene Oxide	—	7
Isopropanol	24	24
Tripropylene	1	3.5
Tetrapropylene	12	30
Acetone	—	—
(via cumene)	16	16
Phenol	—	—
(via cumene)	26	26
Oxo alcohols	1	3
Isobutylene	—	20
Butyl rubber	—	20
n-Butylenes	—	10
Methyl ethyl ketone	—	9
Carbon black	1	41
Aromatics from natural gas	—	48
Benzene	—	8
Para-Xylene	—	7

(Information courtesy of Chemonomics.)

## Scaffolding Methods...by Patent Scaffolding Co.



**MOVE IT AROUND**—For jobs requiring a working surface at a fixed height 3' to 9' above ground or floor level, these aluminum work stands provide the portability of ladders, plus the extra safety and wider application of scaffolding. Ideally suited for reaching hard-to-get-to valves and gauges, inspecting and cleaning tanks, loading and unloading warehoused materials, speeding up a hundred other processing and maintenance jobs. Can be anchored where fixed platforms are required. Platforms of nonskid perforated aluminum vary from 2' to 4' in width, 2' to 8' in length. Special stands for special purposes can be supplied. Write for Bulletin AS-9.

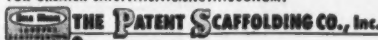


**PREFAB PLATFORMS**—"Trouble Saver"® Sectional Steel Scaffolding is made of prefabricated frames, diagonal braces, bases and adjustable legs. Frames vary from 2' to 5' wide and from 3' to 6' high to provide proper heights and widths of working platforms to fit the job. Here, it gives maintenance crews easy, safe tower access.

Complete scaffolding equipment and engineering service offered through nationwide sales offices or representatives. Look under Patent Scaffolding in the Yellow Pages for your nearest source.

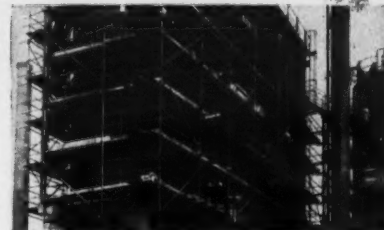
#### SALES

FOR GREATER SAFETY...EFFICIENCY...ECONOMY

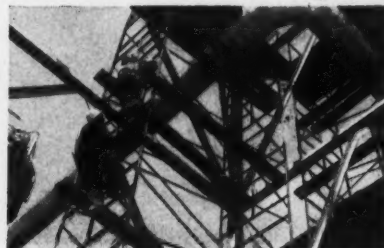


38-21 12th St., Dept. CP, Long Island City 1, N. Y.  
West Coast: 6931 Stanford Ave., Los Angeles 1, Calif.  
In Canada: 355 Dufferin St., Toronto  
Branches in all principal cities.

#### RENTALS



**AT EVERY LEVEL**—Versatile, all-purpose "Tubelox" Scaffolding provides working platforms at every level on coke drum and pipe still sections. Minimum wood staging is required.



**EASY ACCESS**—To get up and around heater units, workers quickly assemble "Trouble Saver" Scaffolding frames to exact heights. Built-in ladders speed the job by providing fast, easy access. Wood planks give necessary staging. 100% recoverable, "Trouble Saver" and "Tubelox" Scaffolding can be economically used indefinitely on many types of jobs.

### CLIP COUPON TO YOUR LETTERHEAD

Send me literature on:

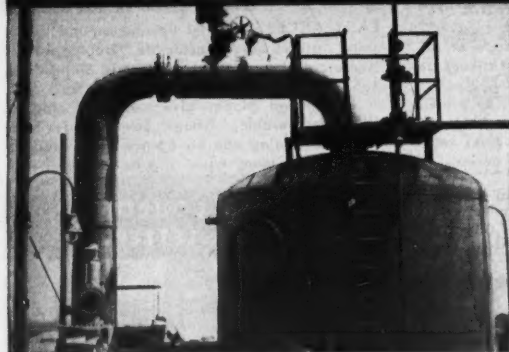
- ☐ "Tubelox"  
☐ "Trouble Saver"

Your Name .....

Check 4467 opposite last page

Check 4469 opposite last page

**Life of vapor line on acid stripping tower at NATIONAL PETRO-CHEMICALS.....**



UNDER THE INSULATION YOU SEE HERE is the line of Revere Deoxidized Copper which has been in uninterrupted service for over a year, and as of this writing continues to serve. Line was fabricated by MATT. CORCORAN COMPANY, Louisville 13, Ky.

increased  
more than  
**800%**  
by switching to  
**COPPER**

**Copper line still going strong after 12 months without causing a single stripping tower shutdown!**

At left is an unretouched photograph of a former overhead vapor line, 18" in diameter, that started to leak after 3 weeks on an acid stripping tower of an ethyl alcohol unit at National Petro-Chemicals Corp., Tuscola, Illinois.

This 10 gauge corroded line was then replaced by another line of a different metal. This lasted 6 weeks, then another failure. Such breakdowns not only are troublesome, they are mighty costly, too.

Original tests of the bubble-cap stripping tower, which removes dilute sulfuric acid from alcohol, showed that vapor from top of tower should contain only alcohol, some hydrocarbons, and SO<sub>2</sub>. But after two shutdowns due to failure of the metals used, a re-examination disclosed that throughput was running slightly higher than anticipated. As a result there was a carry-over of some concentrated sulfuric acid. A line was then ordered, fabricated from Revere Deoxidized Copper, and placed in service. Copper could be used safely as there was no air in the system.

This copper line has now been in service over a year without failing and the stripping tower operation remains uninterrupted.

Another example of selecting the right metal, in the right form to do the best possible job with the greatest economy... whether it be copper, brass or aluminum or any one of their alloys. Perhaps Revere can help you realize similar savings due to superior performance of its metals.

**REVERE COPPER AND BRASS INCORPORATED**

Founded by Paul Revere in 1801  
230 Park Avenue, New York 17, N. Y.

Mills: Rome, N. Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.



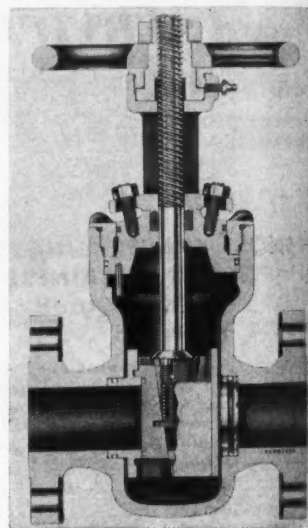
**PETROCHEMICALS**

**Galling eliminated with valve**

**Uses:** For handling gases, petroleum products, petrochemical fluids, and other products.

**Features:** Principle of operation completely eliminates galling or wear at seating surfaces. Insurance against product contamination is furnished through a vapor-tight seal. Valve can be serviced in line.

**Description:** Valve is a non-lubricated, optional-flow, double-block, and bleed-full-opening unit. Driven either by handwheel, gear, or motor, valve is operated by raising or lowering of threaded stem.



Valve for petrochemical fluids

In opening, counter-clockwise turning of hand wheel first withdraws both upstream and downstream discs from contact with seat rings in the body before raising them out of position. This eliminates drag during opening operation.

In closing, discs are held away from floating seat rings until final point of closure is reached at which time a wedge-type spreader forces discs against seat rings. Teflon inserts in discs form a vapor-tight seal. Valves are available in 2 through 6" sizes.

(Keroseal valve is product of Kerotest Mfg. Co., 2525 Liberty Ave., Pittsburgh 22, Pa.)

Check 4471 opposite last page.

Check 4470 opposite last page

CHEMICAL PROCESSING



CP Staff Photo

Irving C. Roth checks four centrifugal pumps which handle 200 gpm of nitric acid at a 40' head

## Pumps handle $\text{HNO}_3$ for four years with no trouble

Nickel-containing stainless steel parts give eight units corrosion resistance, external balanced seal prevents leaks

GORDON WEYERMULLER, Petrochemical Editor

With IRVING C. ROTH, Administrative Assistant  
Cooperative Farm Chemicals Association  
Lawrence, Kansas

Hot nitric acid has been handled since September 1954 by eight corrosion-resistant centrifugal pumps with hardly any maintenance at Cooperative Farm Chemicals Association. One reason for the excellent performance of the pumps is the use of Worthite, a corrosion-resistant stainless steel, in the construction. This alloy contains 24% Ni, 20% Cr, 3.25% Si, 3% Mo, and 1.75% Cu. Impeller and impeller casing, shaft, and suction head are made of the alloy.

Pump stuffing box employs a balanced external mechanical seal (Dura Seal). Teflon seal packing is used in the seal. There is no shaft sleeve to cause leakage, expansion, or corrosion troubles.

The four pumps shown in

photograph are used for 50% nitric at 120°F. These pumps have a 40' head at 200 gpm flow rate. Speed is 1750 rpm. They transfer nitric acid from the oxidation tower to the adsorption tower.

Four smaller pumps of similar construction are used on 57½% nitric at 113°F.

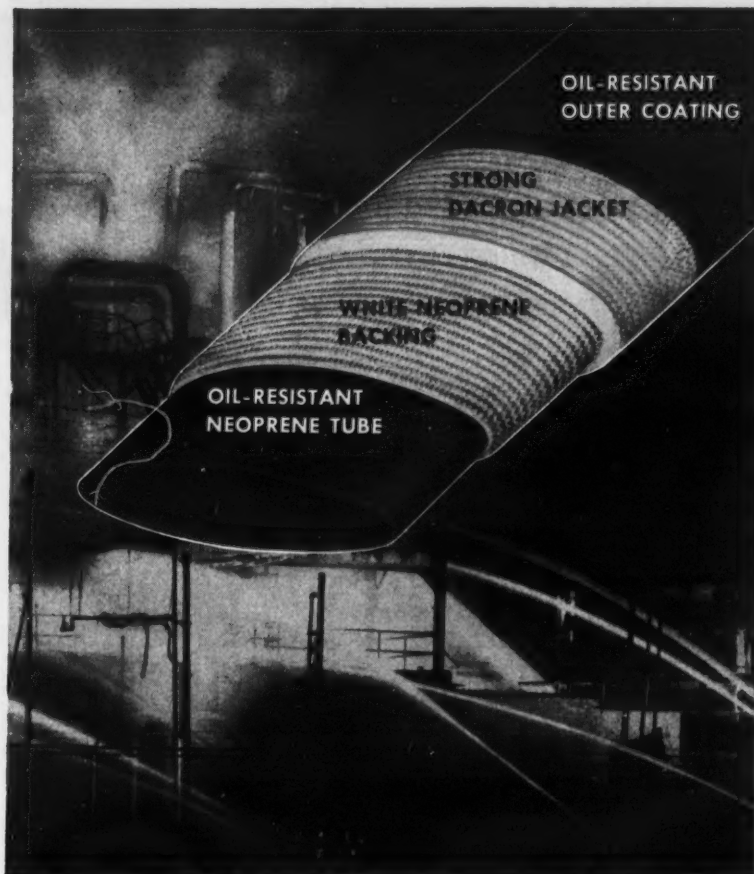
These units operate with 105' head at 40 gpm. Speed is 3450 rpm.

(CNG Worthite centrifugal pumps are product of Worthington Corporation, Harrison, New Jersey.)

Check 4472 opposite last page.

(Dura Seals are product of Durametallurgical Corporation, Kalamazoo 24, Mich.)

Check 4473 opposite last page.



## Strong, light, flexible Petrochem Fire Hose RESISTS CHEMICALS AND OIL

**QUAKER PETROCHEM** is the first fire hose made especially for the chemical and petroleum industries. Rugged and reliable, it's engineered to take the worst abuses these industries have to offer.

**DURABLE** • PETROCHEM hose stands up to abrasion and weather, because it's sheathed in a tough, flexible jacket of DuPont "Dacron", impregnated with oil-resistant neoprene.

**STRONG** • Functions safely under high pressure (up to 500 psi) and excessive heat (up to 300° F).

**CHEMICAL- AND OIL-RESISTANT** PETROCHEM defies deterioration, both inside and out. Good resistance

to acids, alkalies, and oxidants.

**FLEXIBLE** • Takes tight twists or knots without injury.

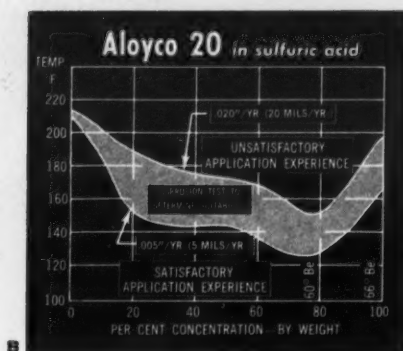
**EASILY COILED** • Saves storage space and time. PETROCHEM can be kept coiled or folded wherever needed.

**ALL-PURPOSE PETROCHEM** hose can be used in virtually every industry where fire-safety counts. For details, ask your Quaker industrial distributor, who offers you fast service and delivery—and the answers to hose and belting problems you may not even know you have. For his name, write Quaker Rubber Division, H.K. Porter Company, Inc.; Philadelphia 24, Pa., or Pittsburg, California.

**H. K. PORTER COMPANY, INC.**  
QUAKER RUBBER DIVISION

Check 4474 opposite last page





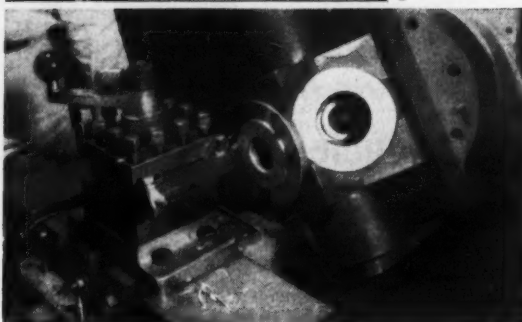
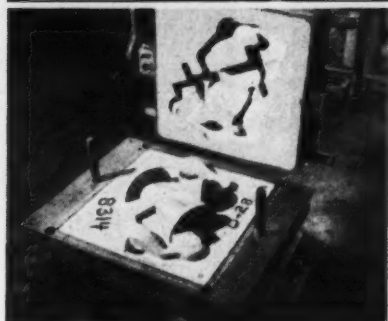
**A. Your Problem** in handling corrosives is discussed with a specialist when you sit down with an Aloyco Sales Engineer. He handles only one line, knows his business.

**B. Right Alloy** for your application is based on 29 years of specialized experience in the field plus continuing research in Aloyco metallurgical labs.

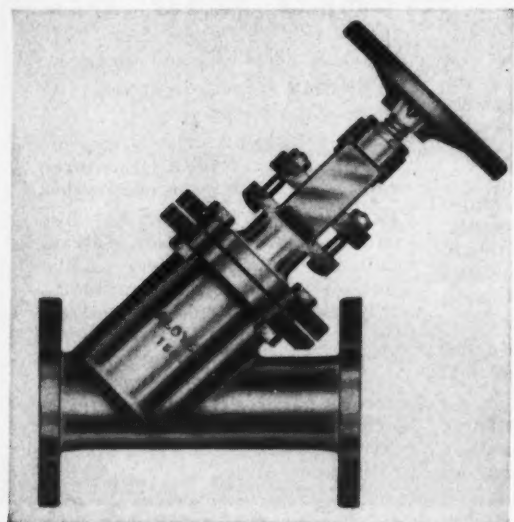
**C. Valve Casting** is made from Aloyco design in Aloyco foundry, only foundry ever built to produce pressure-tight Stainless Steel Valve castings, exclusively.

**D. Special Techniques** in machining stainless steel, plus most modern equipment in Aloyco plant assure you precise tolerances, trouble-free performance.

**E. Aloyco Y Valve**, shown here in various stages of production, is one of Aloyco's complete line of valve types, alloys, sizes, pressures—including nuclear valves.



## BEHIND EVERY ALOYCO VALVE... specialization ... to help you handle corrosives



Valves often look alike—even stainless steel valves. But they won't necessarily perform alike when you get them into the line. Here are some of the special skills and facilities that make the difference between Aloyco valves and others. Some of the "extras" you get with Aloyco valves are staying power, minimum maintenance, trouble-free operation in severe as well as mild corrosive service. Doesn't it make sense that the one company specializing in the manufacture of Stainless Steel Valves exclusively is your best source of supply?



**ALLOY STEEL PRODUCTS COMPANY**

1302 West Elizabeth Avenue, Linden, New Jersey

Check 4475 opposite last page

## PETROCHEMICALS

### Contains technical data on compressors

One interesting section of comprehensive 62-page technical booklet on centrifugal compressors presents fundamental equations used to determine brake horsepower, operating speed, and discharge temperature. Information is also translated into curve form to speed calculations. Typical performance curve illustrates several points important in analyzing centrifugal compressors. A typical example shows how the data and curves may be used.

Many photographs of installations in petrochemical plants and petroleum refineries appear. Case history information is given on each.

Both horizontally split and vertically split compressors are described, the latter being built for pressures in excess of 5000 psi where required. Internal construction features of units are illustrated and explained. Bul 150 — Clark Bros. Co., One of the Dresser Industries, Olean, New York.

Check 4476 opposite last page.

### Pumps handle ammonia continuously at high pressures

Triplex units found dependable at Spencer Chemical

**Problem:** When the Vicksburg plant of Spencer Chemical Co. was being planned, engineers had to find pumps that would meet two major requirements. First, they would have to operate 24 hours a day, seven days a week. Second, they would have to pump precisely controlled volumes of liquid ammonia at high pressures.

**Solution:** After a study of available equipment, two direct-flow, 3/4- by 3"-stroke triplex pumps were selected. Running on alternate 30-day periods, they supply ammonia at exactly the correct high-pressure level.

**Results:** Four years of strenuous service has shown that triplex pumps are capable

## PETROCHEMICALS

of efficient, durable performance in this application. Good results have been achieved despite an outdoor location that exposes pumps to adverse weather conditions. Ac-



One of two triplex pumps in operation at Spencer Chemical

cording to maintenance superintendent, little maintenance has been required, valve life has been excellent, and packing life exceptionally good.

(Triplex pumps are product of Aldrich Pump Co., Allentown, Pennsylvania.)

Check 4477 opposite last page.

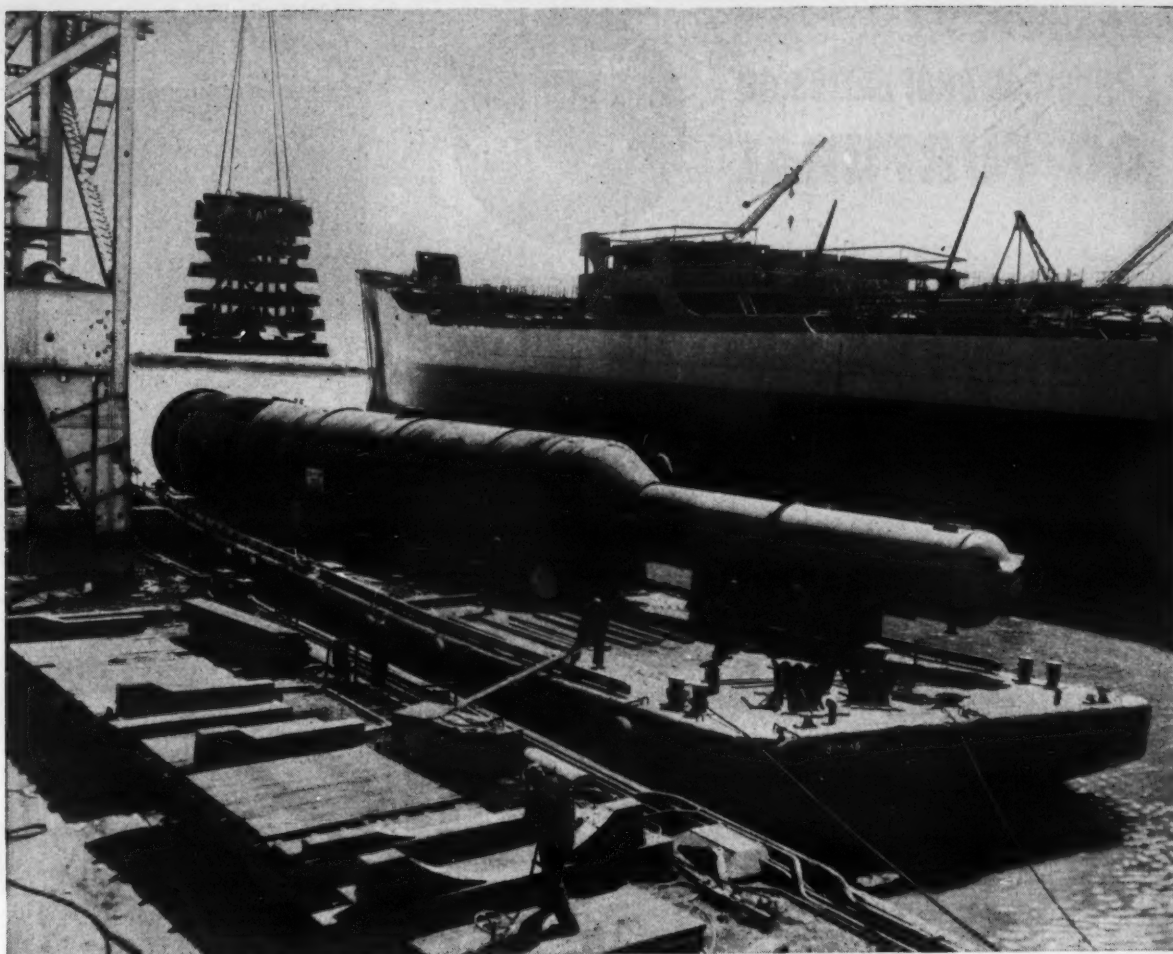
### **British cumene plant will be designed by US company**

A plant for the production of high-purity cumene, which will be used in the manufacture of phenol at the same location, will be built by British Hydrocarbon Chemicals Ltd. at Grangemouth, Scotland. Design for the plant was awarded to a US company. It is scheduled to go on stream about the middle of 1959.

The process, originally developed by Scientific Design Company, Inc., has been licensed to the British company by Standard Oil Company (Indiana), which acquired exclusive world-wide rights to the process last year.

(Design contract for British cumene manufacturing plant was awarded to Scientific Design Company, Inc., 2 Park Ave., New York, N.Y.)

Check 4478 opposite last page.



## standard procedure: VERSATILITY...

The variety of work which Sun Ship's integrated shops produce for use by industries on land and sea brings a matching variety of shipping problems.

Our facilities for tidewater shipment are used to economical advantage on many of the massive structures that go into the making of the nation's petroleum and chemical industries. The barge shipment of tower and shed row baffles, shown above, is a good example.

And of course—when shipment by land is

necessary—Sun Ship rigging and routing find the ways and means to handle such items as large-diameter columns by rail and truck.

It's all a part of the versatility which forty years' experience has made part of "standard procedure" in service of its customers.

Our Sales Engineering Department would be glad to use its experience in helping you overcome any problem of construction or shipment that faces you. Write

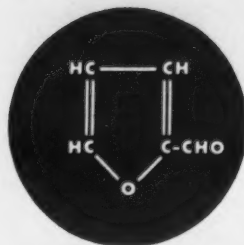
# Sun

## SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE **SINCE 1916** CHESTER, PA.

Check 4479 opposite last page

# PHYSICAL PROPERTIES OF QO® FURFURAL



## GENERAL

Boiling point (at 744 mm), (Todd Still) °C.....	160(98)%
Freezing point, °C.....	-36.5
Refractive index (n 20/D).....	1.524-7
Specific gravity, 20/20.....	1.161-3
Solubility in	
water (wt. % at 20°C.).....	8.3
alcohol; ether.....	∞

## FLUID PROPERTIES

Viscosity, cps. at 25° C.....	1.49
at 38° C.....	1.35
Surface tension, dynes/cm.	
at 30.0° C.....	41.1
Vapor diffusion coefficient, cm <sup>2</sup> /sec.	
at 25° C.....	0.087

## THERMODYNAMIC PROPERTIES

Heat of vaporization, $\Delta H_{\text{vib}}$ , kcal./mole.....	10.22
Thermal conductivity, B.T.U./(hr.) (sq.ft.)	
(°F. per ft.) at 100°F.....	0.1525

For complete details on the physical properties of QO Furfural, write for Bulletin 293-A



## The Quaker Oats Company

### CHEMICALS DEPARTMENT

336Y The Merchandise Mart, Chicago 54, Illinois  
Room 536Y, 120 Wall Street, New York 5, New York  
Room 436Y, 48 S.E. Hawthorne Blvd., Portland 14, Oregon  
In the United Kingdom: Imperial Chemical Industries, Ltd., Billingham, England

In Europe: Quaker Oats-Graanproducten N. V., Rotterdam, The Netherlands; Quaker Oats (France) S. A., 3, Rue Pillet-Will, Paris IX, France; A/S "Ota," Copenhagen, S. Denmark

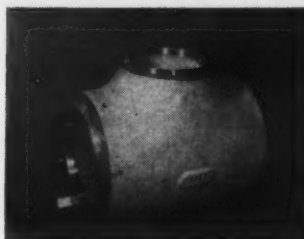
In Australia: Swift & Company, Ltd., Sydney

In Japan: F. Kanematsu & Company, Ltd., Tokyo



Check 4480 opposite last page

## PETROCHEMICALS



### Stainless steel fitting . . .

. . . is typical of manufacturer's line designed for services to 2500 psi at 670°F. Available in both 300 and 400 alloy series stainless steel in sizes 8 to 30", fittings include 45°, 90° elbows, tees, reducers.

(Stainless steel fittings are product of Cooper Alloy Corp., Hillside, N. J.)

Check 4481 opposite last page.

### Infrared analysis

Data sheet of four pages gives detailed information on three important areas of sulfur dioxide analysis by infrared; sulfur recovery from petroleum sour gas, controlling reaction velocity in sulfuric acid plant, and monitoring stack gas in power plants for air pollution regulation. Data Sheet IR-4201 — Process Instruments Div., Beckman Instruments Inc., 2500 Fullerton Rd., Fullerton, Calif.

Check 4482 opposite last page.

### Vapor pressure recorder continuously indicates actual gage pressure

Designed for low-pressure hydrocarbons

Uses: Continuously recording vapor pressure of gasoline, LPG, other low-pressure hydrocarbons. Also indicates proportions of binary mixtures of petroleum gases by a particular vapor pressure.

Features: Continuous vapor pressure recorder reads actual gage pressures. In-line temperature control system is incorporated to reduce sample residence time.

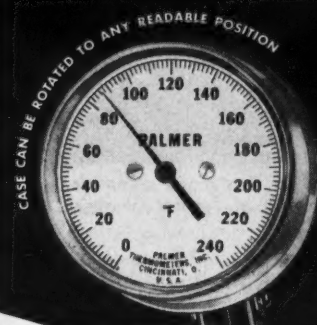
Description: Developed and

# PALMER

presents

an outstanding improvement in

## DIAL THERMOMETERS



Direct Drive

Mercury Actuated

external calibration

Full 3 1/2" Dial Face

- No Sector
- No Pinion
- No Linkage
- Constant Accuracy
- Easy Readability

WRITE FOR BULLETIN 350

# PALMER

THERMOMETERS, INC.

Norwood Ave., Cincinnati 12, Ohio  
Mfrs. of Industrial Laboratory Recording and Dial Thermometers

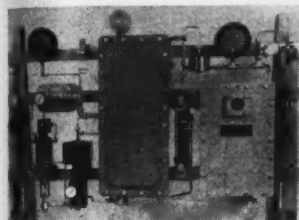
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CHEMICAL PROCESSING



## PETROCHEMICALS

designed by Shell Development Company, pneumatic instrument operates by allowing the liquid sample to continuously pass through vaporizing chamber. When liquid sample reaches equilibrium with its saturated vapor phase, vapor



Continuous vapor pressure recorder operates on 120 psig max air

pressure is measured. Transmitter provides a 3-15 psig air signal for vapor pressure span.

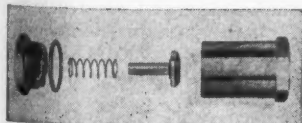
Equilibrium conditions are maintained by controlling sample temperature and flow rate. Instrument is designed for use in hazardous atmospheres (Class 1, Group D).

(Continuous vapor pressure recorder is manufactured by Hallikainen Instruments, 1341 Seventh Street, Berkeley 10, California.)

Check 4484 opposite last page.

### Valves for new fuels feature spring seals for -300 to 2000°F

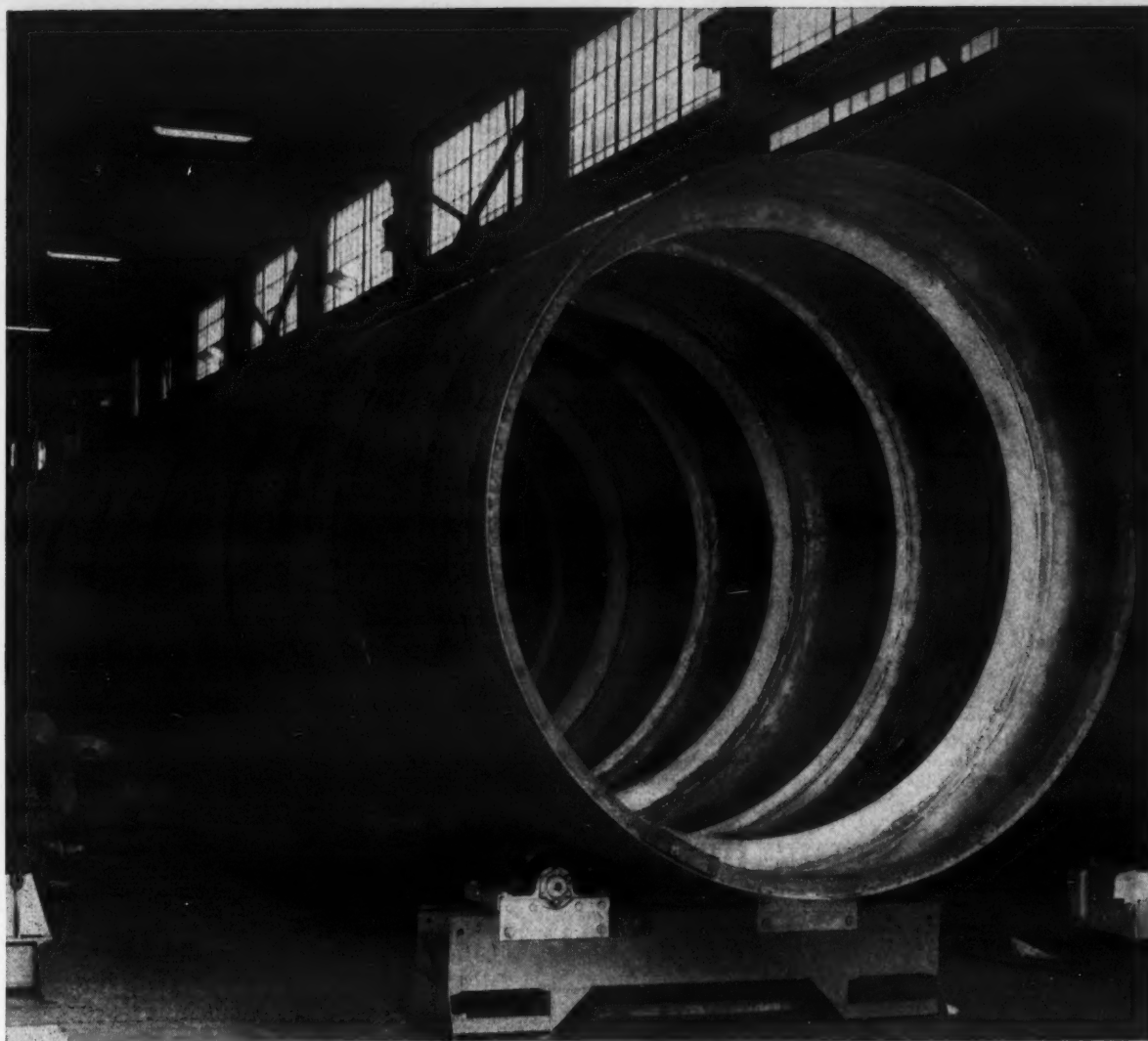
Uses: Valves are designed to handle extreme temperatures involving fuels, oils, gases, and other fluids.



Valve seals have passed temperature range test of -300 to 2000°F

Features: Spring seals used with valves have been severely tested and have passed temperature range of -300 to 2000°F.

Since these valves are of stainless steel or nickel alloy



## For Storage at 297° Below... Under Vacuum

Liquid oxygen is cold stuff. Boiling at 297° below zero, it must be contained in a thoroughly insulated vessel to prevent intolerable evaporation losses. This 9' x 40'3" section, of Type 304 stainless, is the inner compartment of a giant vacuum bottle for liquid oxygen storage. To assure a perfect vacuum, the welds must remain tight over a wide range of temperatures, requiring extreme care in selection of materials and laying in of welds. Applying experienced craftsmanship to such fabrication problems as this is nothing new at Graver. Many years of cryogenic research assures a safe, trouble-free, low-temperature vessel that will give long service. At whatever temperature your product must be stored or processed, you will find the type of custom fabrication you require at Graver.

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New Orleans • Los Angeles • Fontana, California • San Francisco

Check 4485 opposite last page



A dozen vessels built by Newport News were furnished under contract with C. F. Braun, Inc., of Alhambra, Calif., design engineers

for the ultra-modern Delaware Flying A Refinery of the Tidewater Oil Company located 15 miles south of Wilmington.

## Newport News builds 12 major components for new Flying A 130,000-bpd refinery

This is the Tidewater Delaware Flying A Refinery while under construction near Wilmington.

Newport News fabricated 12 of its major vessels — 2 of which are the largest such units ever built: a 250' Orthoflow fluid "cat cracker" converter and a 225' reactor scrubber of the fluid coker.

More notable than size, though, is the quality of the Newport News fabrication.

Coke-out screens in the reactor scrubber, for example, are made of 704 12% chromium segments. Welded together with accuracy, they provide 45% clear opening . . . with opening tolerances less than 1%.

You get expert fabrication, the skill of specialists when Newport News builds your equipment. When you want reactors, pressure vessels, vacuum tanks and the like, sub assemblies or weldments in almost any size or shape, get a bid from Newport News.

Send for newly published, easy-to-read, illustrated booklet, "Facilities and Products". It describes the many ways in which Newport News can help you with present or future projects. Write for your copy today.



Full advantage was taken of the Newport News deep water loading facilities for transportation of all of the equipment by barge. Shop erection prior to shipment assured fast, trouble-free field assembly.

**Engineers:** Desirable positions available at Newport News for Designers and Engineers in many categories. Address inquiries to Employment Manager.

**Newport News** Shipbuilding and Dry Dock Company, Newport News, Virginia

Check 4486 opposite last page

## PETROCHEMICALS

construction, they will handle practically any oils, gases, new fuels, and other liquids and fluids.

**Description:** Manufacturer's static spring seal forms integral part of poppet valve for effective internal sealing. Externally, sealing is accomplished with individual static spring seals — used between body and end-piece of valve.

(Valves and seals are product of Skinner Seal Company, 3001 Sutter St., Santa Ana, Calif.)

Check 4487 opposite last page.

### Petrochemical muscles of Canadian industry still developing

In the last decade, Canada's petrochemical industry has increased its annual output from 185-million lb to 710-million lb. Adding impetus to the industry's impressive growth, Imperial Oil Limited is building a \$25-million plant at Sarnia, Ontario. The multi-product petrochemical plant will occupy a 50-acre site adjacent to Imperial's 84,000-barrel refinery.

Feed stocks will be drawn from the refinery to produce such basic chemicals as ethylene, propylene, normal butylenes, isobutylene, butadiene, aromatic distillates, and tars. Ethylene production of the new plant will more than equal the entire Dominion's present capacity. The butadiene produced will be the first made by private industry in Canada. Completion of the plant is scheduled for this fall.

(Engineering and construction of plant is responsibility of Bechtel Corp., 220 Bush St., San Francisco, Calif.)

### Weatherized motors

Six-page publication describes electric motors designed for outdoor installation on petroleum pipelines, refineries, and similar installations. Bul 51B-8606B — Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 4488 opposite last page.

# U.S.I. CHEMICAL NEWS



A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries



## Polyethylene-Brass Bonds Possible with New Adhesive

A new adhesive developed by Bell Telephone Laboratories and reportedly able to resist a pull of 1,000 psi is being used to bond polyethylene directly to brass, brass-plated metals, and rubber. It is based on a compound described as partly hydrogenated polybutadiene, which is vulcanized by the addition of other materials. Any degree of unsaturation of the polybutadiene from 3-30% is reported to provide excellent adhesive action.

Temperatures from 250-350 F and pressures of 100 psi or less are required for bonding. A layer of the adhesive 2 or 3 mils thick is desirable. This layer can be brushed or sprayed on, or inserted between the materials to be bonded as a thin, prefabricated sheet.

Possible uses include bonding of polyethylene to brass in submarine cable amplifiers for underwater phone cables, linings for tanks and plating racks.



Sandwich of brass, polyethylene and rubber shown here is held together by new adhesive. It can support about 2,000 pounds.

## ISOSEBACIC® Acid Synthesis To Be Described At April ACS Meeting

A paper on U.S.I.'s new dibasic acid synthesis is to be presented at the symposium on alkali metals, being held at the 133rd national ACS meeting in San Francisco, April 13-18.

The process described in the paper was developed for use in the company's new ISOSEBACIC® Acid plant which is soon to go on stream. In this synthesis, butadiene is reacted with very finely dispersed sodium to form disodiooctadiene — an organometallic compound. Carbonation, hydrogenation and acidification then yield three major products — sebacic acid, 2-ethylsebacic acid and 2,5-diethyladipic acid. The mixture of the three has been trade named ISOSEBACIC Acid by U.S.I. and is finding application as a vinyl plasticizer and as an intermediate for many plastic applications. Until the development of this synthesis, 2-ethylsebacic and 2,5-diethyl-

MORE

## National Petro-Chemicals Corp. Becomes a Wholly-Owned Subsidiary of National Distillers

### Giant Tuscola, Illinois Plant Continues Under U.S.I. Management

Panhandle Eastern Pipe Line Company's 40% minority interest in National Petro-Chemicals Corporation has been transferred to National Distillers, which thus becomes sole owner. Panhandle has acquired 1,500,000 shares of National

Distillers common stock in exchange.

National Petro owns and operates a large integrated petro-chemicals plant at Tuscola, Illinois. U.S.I. Division of National Distillers will be responsible for management of this chemical complex as it has been in the past.

Expansion of National Petro beyond the original plan was one factor that led to the transaction. As originally conceived, Petro's basic raw materials were hydrocarbons extracted from Panhandle's natural gas pipeline at Tuscola. However, the company's new polyethylene plant at Houston will use ethylene purchased from another source.

### Nixon Named Petro Vice President

John W. Nixon has been elected Vice President of National Petro, and manager of all National Distillers operations at Tuscola, including the Petro and U.S.I. facilities. Dr. Robert E. Hulse, National Distillers Executive Vice President, was named National Petro Executive Vice President, and Robert Cornwell, U.S.I. Vice President in Charge of Production, has also been named a Petro Vice President.

Since 1951, Petro has been producing ethylene, ethyl alcohol, ethyl chloride, ethyl ether, LPG and later polyethylene at Tuscola. It supplies hydrogen to U.S.I.'s ammonia production facilities. Petro also has the facilities to manufacture other related bulk chemicals on long term contract basis if the demand arises.



Panoramic view of a portion of the National Petro-Chemicals Corporation plant. Ethyl chloride, ethyl ether and ethyl alcohol production and storage facilities are visible in the background.

## Attention: Users of Taxpaid Alcohol for Nonbeverage Purposes

The Alcohol and Tobacco Division of Internal Revenue has recently issued Industry Circular No. 57-37 covering the filing of non-beverage drawback claims on taxpaid alcohol by manufacturers of nonbeverage products. This circular suggests that such claims be delivered personally to the office of the assistant regional commissioner (alcohol and tobacco tax), or sent by registered or certified mail, with postmarked receipt.

The suggestion has been made in order that the time of filing claims may be more readily established. It appears that in the past some claims placed in the mail within the 3-month filing period have not been received in proper time. Without proof of the time of filing, the Division has been unable, under the law, to allow refund in such cases.

## New Technique for Bonding Non-Ferrous Metals Employs Alkali Metal Chloride Mix

Non-ferrous metals which are difficult to join by welding, brazing or soldering can now be bonded by a new and inexpensive process. A solder-like wire, consisting of a mixture of zinc, lithium, potassium and sodium chlorides wrapped in a zinc sheath, is applied to the metal surfaces to be joined after they have been heated to 800°F, the melting point of the wire.

The bond formed is chemical — a eutectic mix of zinc, the alkali metals, and the metals being joined. It is claimed to be strong, corrosion-resistant, and with electrical, physical and chemical properties similar to the metals concerned. Similar or dissimilar surfaces can be bonded using the new technique.

Among the materials which, it is claimed, can be joined by this technique are titanium, zirconium, aluminum, copper, magnesium, zinc, brass, silver, gold, beryllium, platinum, osmium, thorium, uranium, vanadium, tungsten, and some types of steel.



# U.S.I. CHEMICAL NEWS

## CONTINUED

## ISOSEBACIC

adipic acids were relatively unknown.

Reaction conditions are very closely controlled to dimerize butadiene. If polymerization of butadiene were to occur, yields would be drastically reduced.

The paper describes prior art on the synthesis and general laboratory procedure, discusses the reaction and isomer distribution, and mentions other applications of the synthesis. It will be presented by Dr. Charles E. Frank, Manager of U.S.I. Organic Research.

## Other Alkali Metals Symposium Topics

Some of the other topics planned for the alkali metals symposium are: New developments in liquid metals handling equipment; alkali metals as polymerization catalysts; sodium as a nuclear reactor coolant; manufacture of titanium by sodium reduction; alkali metals derivatives as components of Ziegler-type polymerization catalysts; manufacture of synthetic natural rubber, and large scale manufacture of sodium borohydride.

## Paper on Titanium Patent Literature

A paper entitled "Survey of Patent Literature on Preparation of Titanium Metal" will be given for the Division of Chemical Literature at the San Francisco ACS meeting. This report, to be presented by Dr. Janet Berry who manages U.S.I.'s patent section, will graphically illustrate the great growth in titanium technology from patents obtained during the past 35 years.



Dr. Janet Berry and Dr. Charles Frank will present papers at the April ACS meeting in San Francisco.

## Zirconium Provides Bright Light in Tiny Flashbulb

A new photoflash bulb is now on the market which is one-fourth the size of conventional bulbs, yet provides the same amount of light. In addition, the new photoflash gives faster light, and is therefore claimed to be the first bulb which can satisfy both box camera users and professionals who require speed.

These results have been accomplished by replacing shredded aluminum with shredded zirconium. The latter metal oxidizes more efficiently, giving 50% more light per unit weight of oxygen consumed. It creates lower pressure at flash peak, permitting higher initial pressure for faster light. It burns cleaner, blackens the bulb less, and so gives more light.

The new bulb costs no more than regular photoflashes, even though zirconium is currently more expensive than aluminum. Increased production by zirconium suppliers like Mallory-Sharon Metals (owned ½ by U.S.I.) is expected to make zirconium available in larger quantities for this and other uses.

## Methionine Overcomes Urinary Infections

Large doses of methionine have cleared up stubborn urinary tract infections which are resistant to antibiotics or other therapy, according to experiments at an eastern medical school.

Upon oral ingestion, methionine acted as an urinary acidifier, and reduced both the pH and the bacterial count of the urine. After methionine intake, the urine contained an antibacterial substance not present before methionine was given.

### Have you a new product to tell the world about?

Make it routine to send your publicity releases to U.S.I. Chemical News, often called the "Front Page of the Chemical Process Industries." Write the Editor at the address below.

## TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

**Polyethylene containers** can now be coated with a varnish said to cut static, give high sheen, prevent scuffing. Another coating now available is claimed to reduce oil permeability and oxygen diffusion, give glass-like clarity. **No. 1331**

**Ceramic woven fabrics** for high-temperature insulation have been introduced which will withstand heat up to 2,000°F., according to producer. Made of aluminum silicate fiber, they are lightweight, flexible, have low bulk factor. **No. 1332**

**New silicone compound** containing silicoly groups in its structure can now be obtained. It is said to provide sunscreening action, does not wash off easily in water. **No. 1333**

**Porous teflon filter cups** 12 inches high by 5 inches I.D. can now be obtained for atomic energy use. These cylindrical cups are molded in one operation, are porous in the lower 7 inches only. They remove particles over 3 microns. **No. 1334**

**Acylase I**, an enzyme obtained from hog kidneys and capable of separating many synthetic di-amino acids, is now available in developmental quantities. Enzymatic resolution is said to be more economical than other techniques. **No. 1335**

**New type of stirring paddle** combines centrifugal force, suction, shearing action, counter whirl. Claimed to promote high flow velocity through entire vessel, ensuring maximum dispersion with minimum particle size. **No. 1336**

**Acrylic emulsion paint behavior under test exposure** in every climatic region in the U.S. is reported in a 56-page brochure just published. Detailed summaries, tables and photos on 3,000 tests which began in 1952-53 are included. **No. 1337**

**New infrared analyzer** has been announced for measuring concentrations of gases of medical interest such as carbon dioxide, nitrous oxide, cyclopropane, etc. It is expected to be used in such work as pulmonary investigations and research on new anesthetics. **No. 1338**

**A method for restoring the flavor of processed foods** by adding flavor enzymes is described in a reprint now available. The studies described were carried out on cabbage and related foods, but the method works with many other foods. **No. 1339**

## PRODUCTS OF U.S.I.

## ALCOHOLS

**Ethyl Alcohol (Ethanol):** Specially denatured — all regular and anhydrous formulas. Completely denatured — All regular formulas for industrial use, anti-freeze. Pure alcohol — USP 190° — Absolute, N.F., taxfree, taxpaid.

**Proprietary Denatured Alcohol Solvents:** SOLOX® — General-purpose. FILMEX® — Special, authorized for certain industries, ANSOL® M — Anhydrous, special blend for lacquers, resins, etc. ANSOL® PR — Anhydrous, special blend with higher ester content and solvency for lacquers, resins, etc.

## OTHER PRODUCTS

## PETROTHENE® Polyethylene Resins

**Organic Solvents and Intermediates:** Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, ISOSEBACIC® Acid, Sebacic Acid, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.

**Pharmaceutical Products:** DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Riboflavin USP, Intermediates.

**Heavy Chemicals:** Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sodium Sulfite, Sodium Sulfate.

**Reactive Metals, Oxides and Salts:** Zirconium, Zirconium Oxide, Zirconium Tetrachloride, Titanium, Hafnium, Hafnium Oxide, Hafnium Tetrachloride.

**Development Chemicals:** Ethylaluminum Sesquichloride, Methylaluminum Sesquichloride, Monomethyl Hydrazine, Triethyl Aluminum, Trimethyl Aluminum, Unsymmetrical Dimethyl Hydrazine.

**Animal Feed Products:** Antibiotic Feed Supplements, BHT Products (Antioxidant), Calcium Pantothenate, Choline Chloride, CURBAY B-G®, Special Liquid CURBAY, VACATONE®, Menadione (Vitamin K<sub>3</sub>), DL-Methionine, MOREA® Premix, Niacin USP, Riboflavin Products, Special Mixes, U.S.I. Permadry, Vitamin B<sub>2</sub> Feed Supplements, Vitamin D<sub>3</sub>, Vitamin E Products, Vitamin E and BHT Products.

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**U.S.I. INDUSTRIAL CHEMICALS CO.**  
Division of National Distillers and Chemical Corporation  
99 Park Avenue, New York 16, N. Y.

## Plant Payout

From page 29

**Competition** is important. Are the competing companies wide awake ones with keen management? Are they possibly planning on increasing their production of the product you are considering manufacturing? How does their process compare with yours? Are the competing processes easier to improve, capable of having their operating costs lowered as pressure is put on them? Is it likely that new, better processes for the manufacture of your product may come along? Have you satisfied yourself that your competitive situation in this respect is excellent?

All these questions must be answered as well as possible. Obviously many answers will be the result of guided guesswork. But guesswork in this area will be infinitely better than not giving thought to the questions at all.

### General Business Conditions

There is another large area which must be studied in evaluating a proposed chemical venture and in determining the time in which it should pay out. This area is equally full of questions, the answers to which can shorten or lengthen the acceptable return period. This area is the general business atmosphere into which the venture is to be born. Does it look as though business, in general, will turn down, or up, or stay at the present level? Other things being equal, signs of continued business prosperity lessen uncertainty and can point toward consideration of a longer payout time.

**Labor** enters the picture. How does the labor supply, and the future wage situation look? Is there certainty of obtaining adequate skilled and unskilled labor? Is the area one of labor stability, or not? Can suitable operating supervisors be obtained or trained so as to insure high plant efficiency? Is sound operating



**Worn high alloy slurry pump parts, once scrapped, now resurfaced with Inco-Weld "A" . . . last longer than new ones!**

## Now . . . one electrode . . . Inco-Weld "A"\* handles most problem welds

**... joins most dissimilar alloys, too!**

The man in the picture is pointing out the resurfaced section on the cover of a stainless steel slurry pump taken from a Chicago refinery.

A year or so ago, pumps like this would have gone to the scrap heap.

Repair by welding did not seem to be practical. A different electrode would have been needed for virtually every job. And if you picked the wrong electrode and cracking developed, you'd have a bigger loss than if the pump were scrapped in the first place.

Today, with Inco-Weld "A" electrode, repair problems like these are a cinch. Weldors at Cimino Machinery Repair Co. get strong, sound, machinable welds using their regular equipment and procedures. Corrosion resistance of the weld deposit presents no problem. Service records show that the repaired

pumps last longer than new ones.

Versatile Inco-Weld "A" electrode also gives X-ray quality welds between many dissimilar alloys . . . ferritic and austenitic stainless steels . . . low alloy and mild steels . . . high nickel and other alloys.

**New illustrated folder** shows where and how you can use Inco-Weld "A" electrode successfully. Contains case histories, useful tips. For your copy of Inco-Weld "A" bulletin, just write Inco.

Inco Rod "A" is now being called Inco-Weld "A". No change in the product.

\*Registered trademark

**THE INTERNATIONAL NICKEL COMPANY, INC.**

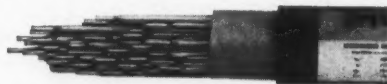
67 Wall Street



New York 5, N. Y.

**INCO WELDING PRODUCTS**

electrodes • wires • fluxes



For more information on product at left, specify 4489 . . . see information request blank opposite last page.

Check 4490 opposite last page

management available? Questionable items in this category will increase the risk and point toward shorter payout time requirements.

**Capital** can be put to a number of uses. Is the one under consideration the most profitable? Can a lower payout time or a greater return be made by another investment? Comparisons in this field will indicate what return should be demanded.

**Raw material** availability is important. Can the supply be depended upon, and the price be properly forecast? Is there risk in this direction? Can new uses for some of these materials greatly increase their demand, and raise their cost to you?

#### Other Risks

There are still other risks which must be carefully considered. Are there any legal obstacles to the successful carrying out of the business? Are there any possible patent complications, maybe unforeseen? Are all bugs completely worked out of the proposed process, or is it likely that a long breaking-in period may become necessary? Will it be necessary to undertake expensive research and development to maintain your competitive position and to insure continued growth of the market for your product?

How about the overall safety of the process operation? Is it high or are there unavoidable, unknown hazards involved? Is it possible you may later have to consider high liability insurance, or have to contend with expensive litigations?

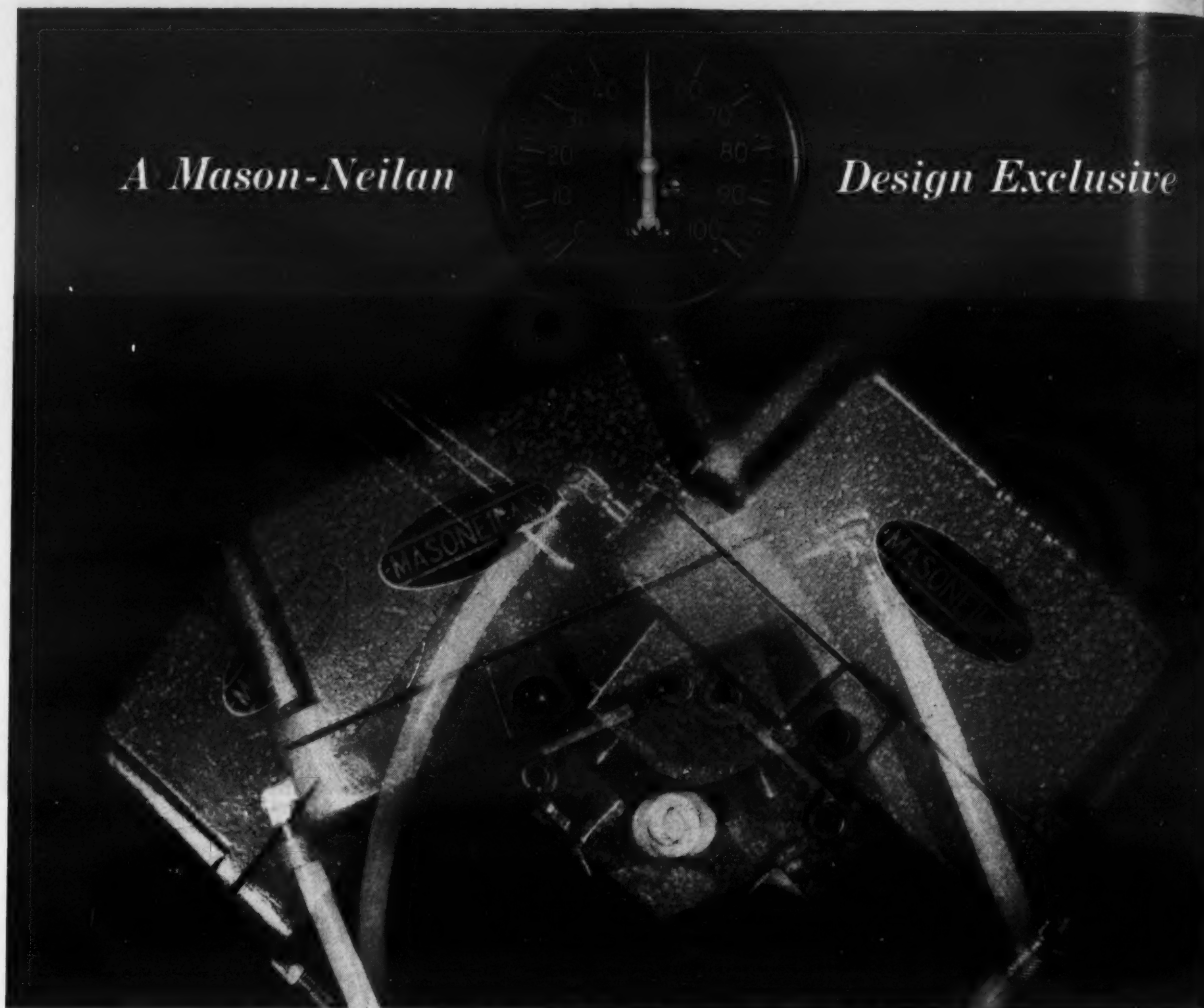
Finally, should you persevere have to suspend operation because of its unprofitability or some other unexpected reason, what kind of a salvage value will your plant have? Could it be converted over to the manufacture of some other chemical product? How much would it cost to do so, and what would be your resulting competitive position in the field?

#### The Final Decision

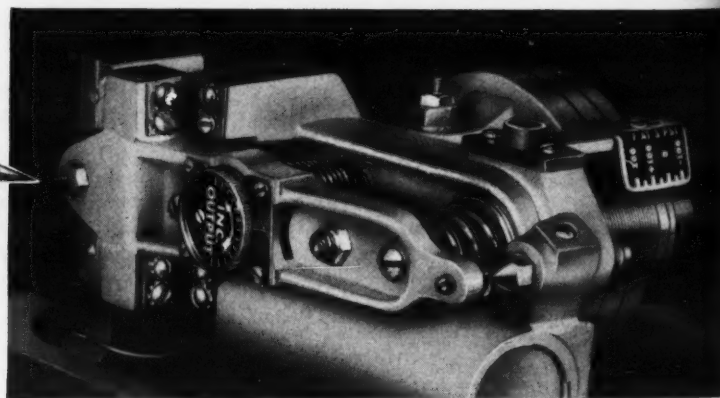
All the many questions posed above must be answered in one way or another. They, with the basic quantitative

*A Mason-Neilan*

*Design Exclusive*



**This oscillating test mount** demonstrates the effectiveness of Masoneilan "Balanced Beam" design. Output pressure does not change, regardless of transmitter position.



**Balanced beam** construction also shows how the entire assembly has been compactly designed. Adjustment on front of beam provides means of synchronizing output range with the primary element span. Damage protection is provided for primary element, by beam stop and overrange feature; for compensating bellows by built-in stops; for entire unit by rugged, weather-proof case.



# Masoneilan Pressure and Temperature Transmitters use Balanced Beam to Prevent Zero Shift

*The new Masoneilan Transmitters feature a distinctive balanced beam design which eliminates positional error*

In addition, these transmitters offer several other important design advances. Unit construction simplifies change or removal of subassemblies; All adjustments are visible and accessible; Large pilot capacity insures fast operation with long transmission lines; and Unit is compensated for ambient temperature and barometric pressure.

*Write for Bulletin*

Complete information and data on

this new instrument is now available. Write for your copy or ask for details at your nearest Mason-Neilan office.

## MASON-NEILAN

Division of Worthington Corporation  
25 NAHATAN STREET, NORWOOD, MASS.



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Appleton • Birmingham • New Orleans • Seattle • Jacksonville  
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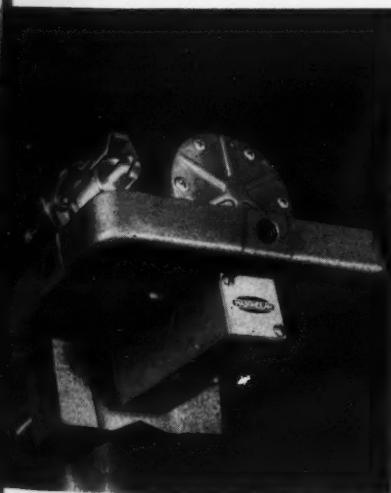
economic figures, must be considered in evaluating the risk involved in the consideration of the new chemical plant. A complete economic analysis plus a complete survey of the general as well as the specific situation will permit some kind of appraisal of the hazards or risks involved in the project.

The total risk will be difficult to measure exactly. However, just because we have listed so many eventualities is no reason to feel that the total risk is too great, or that the return must be ridiculously high. These are everyday risks, taken all the time, and those who best weigh them and provide for them are most successful.

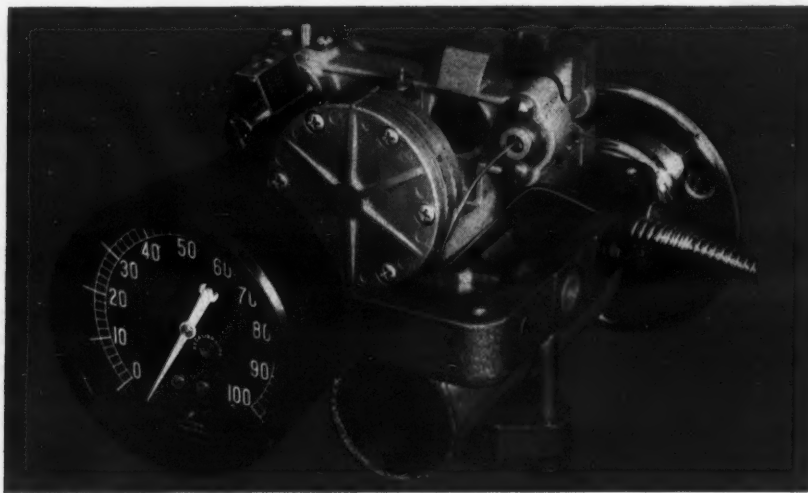
In the case considered earlier, the two-year payout period is certainly attractive. But taxes must be paid, so five years might be more reasonable. Is five years after taxes good? If risks are not too high, if the overall picture is good, five years after taxes should certainly be considered. But if there are grave risks, if the picture does not look too bright, a figure of three years might better compensate for the hazards inherent in the project. On the other hand, a stable and growing market situation, fair potential risks, and an undoubtedly rosy future might indicate that an eight-year payout period after taxes might not be excessive. Careful consideration and analysis of the many, many factors involved can lead one to an answer, in his own particular situation, of how soon the chemical plant should pay out.



"Orders coming in? Swell! Now let's hear the noise from the compressors again..."



The derivative unit compensates for lags in the thermal system. It can be quickly added on the underside of base plate, and requires no tubing or fittings. Mounting block attaches to flat surface or forms clamp for pipe.

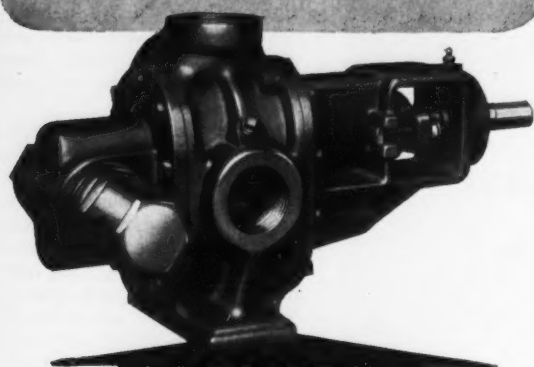


Unit Subassembly construction permits simplified removal or change of primary element; compensating bellows; feed-back bellows; pilot; range span adjustment; derivative unit; and gasketless nozzle — any or all without disturbing beam assembly in any way. Integral Receiver Gage is another Masoneilan feature — can be mounted directly on base plate without external connections.

Check 4491 opposite last page

# ROPER

**STANDARD PUMPS  
FOR PROCESS INDUSTRIES  
All-iron and All-iron with  
Bronze Bearings**



**ROPER**  
**SERIES 3600**  
General Purpose Pump

40-300 G.P.M.  
TO 90 P.S.I.

Designed for a broad range of clean liquid applications, the Roper Series 3600 General Purpose Pump is widely recognized for its highly dependable performance, low maintenance characteristics, and ease of installation. • Roper standard fitted models have cast iron housings, hardened iron gears, 4 high-lead bronze bearings and precision-ground steel shaft. All-iron models, with hardened iron bearings, are also available for specific needs. All models are available with or without adjustable relief valve in mechanical seal or packed box construction. • The Roper representative in your vicinity will be glad to go over your requirements with you, whether you are interested in pumps for replacement or for original equipment in new processing operations. Call him today!

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*Send for  
Catalog  
today!*

**ROPER**  
**ROTARY PUMPS**

**ROPER HYDRAULICS, INC.**  
744 Blackhawk Park Avenue, Rockford, Illinois

Check 4492 opposite last page

## Research program to study pattern of creativity in the sciences

Library to collect and code scattered, pertinent literature

Research program has been organized by New York University's Division of General Education to investigate patterns of creativity in science. Series of seminar meetings is one of first projects planned under the program. Participants will be research workers and managers from government, industry, and schools.

### Operational Approach

Using an operational approach, members will seek to arrive at ways of dealing with creativity, to delineate creative research patterns, and to foster interscience research projects.

Reference library will be established to collect and codify the extensive but scattered literature pertinent to creativity in the sciences. Annotated bibliographical material will be published.

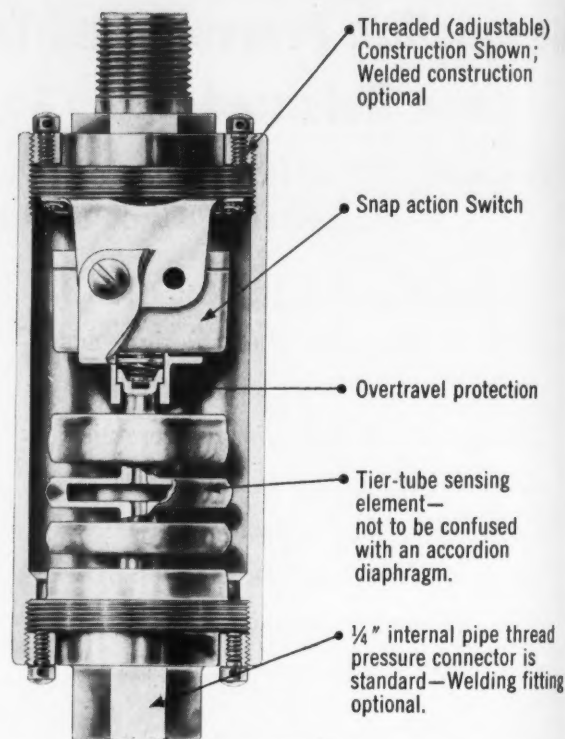
According to dean of the division, Paul A. McGhee, the program is dedicated to the belief that our creative talent is the single most valuable resource of our country, and its adequate conservation and cultivation is one of our most important educational needs and responsibilities.

### Recognition in 3 Areas

The three areas in which recognition of creative talent and its proper encouragement can be of inestimable value are, according to the dean: 1) recognition of talent in young people, 2) utilization of accumulated unused talent in our aging population, and 3) discovering area of greatest creativity in persons with misplaced creative talent.

(Further information about creativity research program may be obtained from Dr. Myron A. Coler, New York University, Division of General Education, Washington Square, New York, N.Y.)

## NEW PRESSURE SWITCH FOR HIGHLY CORROSIVE MEDIA



### SAVE EXPENSE OF CHEMICAL PROTECTORS...OFTEN MORE THAN THE PRICE OF THE PRESSURE SWITCH

This new tier-tube line of Meletron pressure switches is available in materials suitable for use with concentrated hydrogen peroxide, fuming nitric acid, liquid oxygen, proprietary amine fuels, fluorine, mixtures of fluorine and liquid oxygen and others.

Proof pressures range from 224 to 6000 P.S.I., pressure settings from 2 to 4800 P.S.I. Switches will operate in temperatures from  $-65^{\circ}$  to  $+275^{\circ}$  F. Standard pressure port fitting is  $1/4$ " internal pipe thread but may be substituted by special welding fitting. The housing serves as a pressure tight safety capsule in case of a break in the sensing element. Single pole double throw switching elements are rated to 10 amps., for AC and DC circuits. Free leads or Cannon plug are optional for electrical connection. As an added safeguard, the stainless steel models will withstand  $2000^{\circ}$  heat for five minutes.

Write for bulletins 1110 to 1170.

PRESSURE SWITCH DIVISION



**Barksdale valves**

5125 ALCOA AVENUE • LOS ANGELES 58 • CALIFORNIA

Check 4493 opposite last page

CHEMICAL PROCESSING



At Union Carbide Nuclear Company's Uravan, Colorado mill, uranium and vanadium are recovered from carnotite ore mined from surrounding western Colorado deposits.

As received, this ore contains less than 1% uranium, yet the AEC requires a 75%-minimum  $U_3O_8$  content in the final concentrate from the mill. Although conventional refining processes are used to treat the ore and partially separate the vanadium, final separation of the uranium from residual vanadium is made economically feasible when

Four columns, each eight feet in diameter, contain a strongly basic anion exchange resin of the polystyrene quaternary amine type. Three columns are used in series to separate uranium from liquor. Fourth column is regenerating on salt — eluate is treated with ammonia to precipitate the uranium. Resin has held up well over two-year period



## Rugged and Selective Anion-Exchange Resin Adsorbs Uranium

FRANK E. McELROY, Associate Editor  
With J. M. CHANDLER  
Mill Superintendent  
Union Carbide Nuclear Company  
Uravan, Colorado

At Union Carbide Nuclear Company's Uravan, Colorado, mill, uranium and vanadium are recovered from carnotite ore obtained from western Colorado mines. After crushing the ore, a salt-roast, acid-leach process is the first step in recovering the uranium and vanadium.

Primary partitioning of the uranium and vanadium is effected in a batchwise leach of water-soluble vanadium from salt-roasted ore. Vanadium is isolated from the water-leach liquor by chemical precipitation. This is followed by filtration and fusion to produce a fused vanadium oxide product.

Uranium and residual vanadium are now recovered from the water-leached ore. A continuous acid leach circuit is used to supply feed liquor to an ion-exchange unit for isolation of uranium. Vanadium-rich effluent is recycled from the ion-exchange columns to the roaster circuit to recover the residual vanadium.

### Recovery Through Ion Exchange

Batches of the uranium-rich liquor are adjusted to feed spec-

ifications, and pumped continuously through a series of three columns packed with an anion exchange resin. At the same time, a fourth resin column is off-stream and is being eluted with a sodium chloride solution. A system of synchronized automatic valves directs the flow of feed liquor and NaCl elutriant through the respective columns on a predetermined time cycle.

The sequence provides countercurrent operation of the three resin columns that treat the uranium-bearing liquor and also directs the eluting solution through the fourth (fully loaded) resin bed. The solution effluent from the third resin column (called the "scavenger column") is chemically treated and is then recycled to the roaster circuit for subsequent recovery of the vanadium and trace amounts of uranium.

The pregnant sodium chloride eluate from the fourth column being regenerated, contains the purified uranium. The solution flows to the uranium withdrawal department where ammonia is added to precipitate the uranium. The ammonium uranate precipitate is filtered out and is then thermally decomposed to produce a uranium oxide product, relatively free of metallic ion contamination. ( $U_3O_8$  content is a minimum of 75%.)

The ion-exchange unit is a

relatively recent addition to the Uravan plant. Two years ago the unit replaced a costlier chemical separation process that had previously been used for the isolation and purification of uranium. The ion-exchange unit contains four cylindrical columns eight feet in diameter, packed to a height of six feet with a strongly basic anion-exchange resin of the polystyrene quaternary amine type (Amberlite IRA-400).

### Ion-exchange Process Details

This type resin was selected as the exchange media because of its resistance to attrition, strong acids and alkalis, and its selectivity for the sorption of uranium in the presence of reduced vanadium and iron. This resin is also suitable for use with an economical elutriant such as a sodium chloride solution.

The cycle time is three hours for loading the resin and one hour and fifty-five minutes for the elution of the sorbed uranium. The elution time is less than the loading time by the amount of time required to wash the resin beds both before and after elution.

Cycle timing is controlled by a Taylor Flex-O-Timer. The timer rotates the positioning of the Farris air-operated valves, located at the en-



Operator Dan Anders modifies cycle through panel board controlling automatic equipment which synchronizes flow of uranium-rich feed liquor and salt-containing elutriant solution through ion-exchange columns

trance and exit lines of the columns.

The performance of the automatic equipment synchronizing the ion-exchange unit operations has been entirely satisfactory.

One important finding that was made — the feed liquor to ion exchange beds must be free of solids, as this adversely affects resin bed loading and unloading characteristics and throughput.

In addition to uranium sorption, the Amberlite IRA-400 resin has an affinity for molyb-

To page 106



### Two lanolin derivatives have unique solubility

**Uses:** In cosmetics, pharmaceuticals, and aerosols.

**Features:** Properties of these lanolin derivatives are obtained by balancing hydrophilic polyoxyethylene with hydrophobic acetyl groups. The result is persistent emollient films, and solubilizing properties for new effects.

**Description:** The Solulans® are polyoxyethylene derivatives of lanolin. They are 100%-active, non-greasy, clear liquid products.

The Ricilans® are hydrophobic viscous liquid waxes composed of polymeric hydroxyesters derived by synthesis from natural substances, lanolin, castor oil.

(Solulans and Ricilans are available from American Cholesterol Products, Inc., Amerchol Park, Edison, N.J.)

Check 4495 opposite last page.

### Effectively 'blocks' ketone groups in syntheses

**Uses:** As "blocking" agent for ketone groups in synthesis of certain pharmaceuticals, biologicals, perfumes, flavoring materials, and agricultural chemicals.

**Features:** By protecting selected ketone groups of intermediate, other functional sites can be reacted. After syntheses, blocked ketone groups can be regenerated.

**Description:** 2-Methyl-2-ethyl-1,3-dioxolane is a water-white liquid available in drum quantities.

(Methyl ethyl dioxolane is a product of Union Carbide Chemicals Co., 30 E. 42nd St., New York 17, N. Y.)

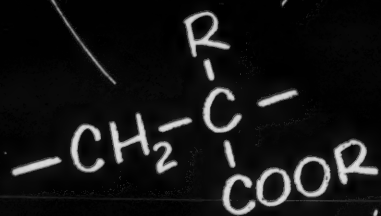
Check 4496 opposite last page.

### Silicone emulsion data

Three data sheets of four pages each discuss silicone emulsions for use as parting agent, mold lubricant, other applications. Buls on SM-55, -61, and -62 — Silicone Products Dept., General Electric Co., Waterford, N.Y.

Check 4497 opposite last page.

*acrylic links in your polymer chain improve heat and light stability*



## ROHM & HAAS ACRYLIC MONOMERS

Resistance to degradation by heat and light is a basic property of acrylic polymers. Through copolymerization with acrylic monomers, greater heat and light stability can also be imparted to polymers based on such monomers as vinyl chloride, vinyl acetate, vinylidene chloride, acrylonitrile or styrene. Improved heat and light stability are but two of the benefits contributed by copolymerizing with acrylic monomers. By using the proper

Rohm & Haas acrylic monomers, you can impart other advantages such as internal plasticization, improved compatibility with other resins, faster polymerization rate and greater copolymer yield, better adhesion, increased emulsion stability, and solubility in alkalis.

Write to Department SP for detailed technical literature on Rohm & Haas monomers, the widest range of acrylic monomers available.

### ROHM & HAAS ACRYLIC MONOMERS

METHYL ACRYLATE	BUTYL METHACRYLATE
ETHYL ACRYLATE	HEXYL METHACRYLATE
BUTYL ACRYLATE	DECYL-OCTYL METHACRYLATE
2-ETHYLHEXYL ACRYLATE	LAURYL METHACRYLATE
METHYL METHACRYLATE	STEARYL METHACRYLATE
ETHYL METHACRYLATE	GLACIAL ACRYLIC ACID
GLACIAL METHACRYLIC ACID	



Chemicals for Industry

**ROHM & HAAS  
COMPANY**

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

Check 4494 opposite last page

THAT'S  
INTERESTING

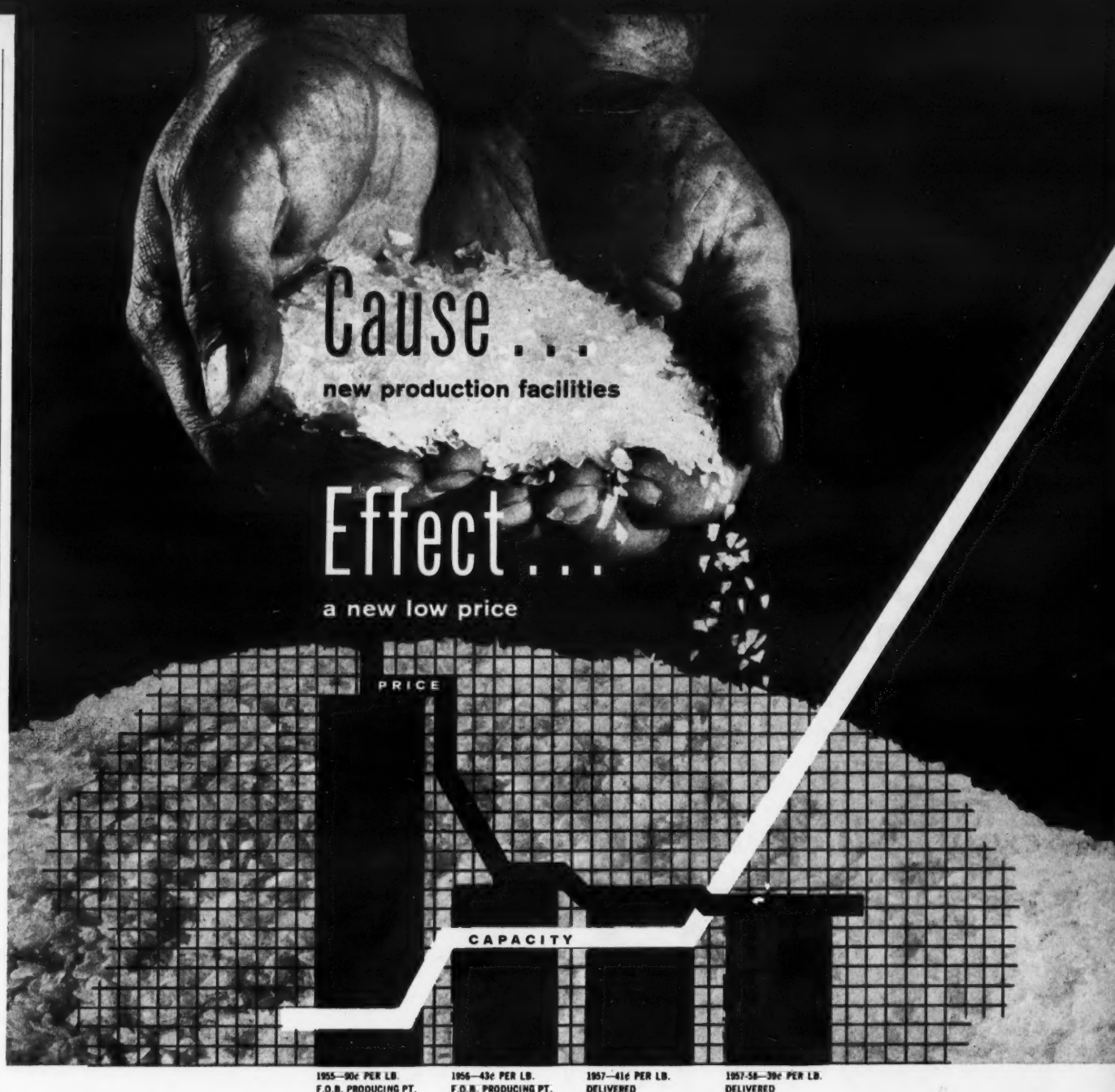
#### Just chewin'

Man's natural inclination to chew on something has drawn a benefit from modern technology. Primitive people chewed grass, berries, and tree barks. Today, chewing gum is a product offering a wide variety of flavor and using as many as 15 different ingredients. In a year, sale of chewing gum in the US brought \$271 million. (Industrial Bulletin, Arthur D. Little, Inc.)

#### Weight in space

Space vehicles will need some form of gravity to relieve the humans and instruments from abrupt force of thrust adjustments or course changes. A slow spin given to the ship will be one method of attaining this gravity. Apparent force will depend on speed of spin and centrifugal force generated. (Skywriter, North American Aviation, Inc.)

For more information on product at right, specify 4498 see information request blank opposite last page.



### TRIMETHYLOLPROPANE... a fast 10,000,000 lbs. to feed growing industry

The properties of this free-flowing polyol are of prime importance to the fast-growing polyurethane foams industry. Trimethylolpropane's ability to improve both rigid and flexible foams, coupled with its easier processing, offer extremely valuable manufacturing advantages. And in the large alkyd resins

industry serving the \$1.6 billion paint market, this chemical intermediate is also finding important application.

But, until Celanese developed a method for high-volume, low-cost production, the usefulness of trimethylolpropane was severely limited. Today, a major Celanese production

facility at Bishop, Texas, is geared to turn out in excess of 10 million pounds, providing industry with a high quality product at a practical price.

This is another example of how Celanese development and production anticipate and meet the needs of progressing industries.

Celanese®

#### Basic reasons .....

Acids	Functional Fluids	Polyols
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Anhydrides	Ketones	Solvents
Esters	Oxides	Vinyl Monomers



#### ..... for improved products

Agricultural	Paper
Automotive	Pharmaceutical
Aviation	Plastics
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CELANESE CORPORATION OF AMERICA, CHEMICAL DIVISION, DEPT. 591-D, 180 MADISON AVE., NEW YORK 16.  
EXPORT SALES: AMCEL CO. INC. AND PAN AMCEL CO. INC. 180 MADISON AVE. NEW YORK 16.

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**METHYL BORATE**



Except for its very ready hydrolysis by atmospheric moisture, Methyl Borate,  $B(OCH_3)_3$  is a quite stable compound. It does not decompose thermally below 400°C.

We'd like to discuss with you one or more of these suggested uses of Methyl Borate: as a non-aqueous solvent, as a catalyst in organic synthesis, in azeotropic distillation, as a flame-retardant additive, to prepare substituted boranes, as a catalyst for Diborane reactions, as a neutron absorber and detector, as a stabilizer for sulfur trioxide. Write for Technical Bulletin C-510.



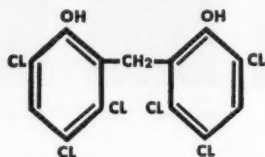
Phone: F0rest 4-1130 TWX: 117 Perryville, Pa.

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CHEMICAL COMPANY  
PITTSBURGH 37, PENNSYLVANIA

Check 4499 opposite last page



**King of bacteriostats ...**  
**G-11<sup>®</sup>**  
(HEXACHLOROPHENE U.S.P.)  
(U.S. Pat. 2,250,480)



Sindar's G-11 (Hexachlorophene U.S.P.) now imparts bacteriostatic and deodorant properties to MORE THAN 2,000 PRODUCTS used in homes, hospitals and industries! Over 95% of America's hospitals use G-11 soaps or detergents for the surgical scrub ... more consumer dollars are spent for G-11 soaps than for any other brand. In cosmetics and pharmaceuticals, too, G-11 is the chosen antiseptic.

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Industrial Aromatics and Chemicals

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Check 4500 opposite last page

## CHEMICAL MATERIALS

### Anion-exchange Resin

From page 103

denum, silica, and phosphate. Metallic ion poisoning of the resin decreases the effectiveness of the resin for uranium sorption by occupying resin sites which could otherwise be available for exchange with uranium ions.

Principal offenders are molybdenum and silica but appreciable amounts of uranyl phosphate and arsenic are sorbed by the resin and are not removed by the standard brine elutriant. Satisfactory performance is obtained by periodically treating the resin with a caustic wash solution.

Resin bed inventories are adjusted for losses and no wholesale replacement of resin has been necessary during two years of continuous usage.

It is apparent from over two years of continuous use of this ion exchange unit that uranium purification and isolation from acid leach liquors is highly efficient when clear liquor is fed to the resin beds and periodic regenerations are performed to remove sorbed contaminants. The degradation of resin with time seems to be well within a reasonable economic limit.

(Amberlite IRA-400 ion-exchange resin is a product of Rohm and Haas Co., Washington Sq., Philadelphia 5, Pennsylvania.)

Check 4501 opposite last page.

### Polyethylene compound has UV inhibitor

**Uses:** In molding or extruding outdoor products.

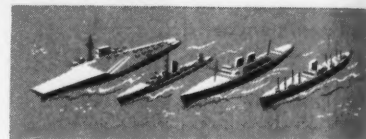
**Features:** Material is first polyethylene plastic to be specifically compounded with an ultraviolet inhibitor. It will last two to four times longer outdoors than polyethylenes that contain no inhibitors to protect them from the sun.

**Description:** New polyethylene compound was made possible by development of an ultraviolet inhibitor that is compatible with polyethylene. It was also necessary to de-

## BY WILLIAMS CUPROUS OXIDE

for Navy Specification  
Shipbottom paints—and other  
Marine Anti-fouling paints.

# CO-97 CO-90



These two Cuprous Oxides ... CO-97 and CO-90 ... as made by Williams ... meet all chemical and physical requirements of U. S. Navy Specification MIL-C-15169 (Ships) for Type I and Type II. They are produced in a modern plant especially designed to supply Navy demands during World War II.

NOTE: Also for fungicides, insecticides, and a reagent for catalytic work.

#### ESSENTIAL PROPERTIES

	CO-97 (Type I)	CO-90 (Type II)
Cu <sub>2</sub> O—Min.....	97%	90%
Total Cu—Min....	86%	80%
Cl—Max.....	0.4%	0.4%
SO <sub>4</sub> —Max.....	0.1%	0.1%
Acetone Sol.—Max.	0.5%	0.5%
HNO <sub>3</sub> Insol.—Max.	0.3%	1.0%
325 Mesh—Max. .	0.5%	0.5%
Metals not Cu—Max.	0.5%	—

For complete information on prices, packages and samples, please get in touch with your nearest Williams representative, or write us direct.

Address Dept. 75, C. K. Williams & Co.,  
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# WILLIAMS

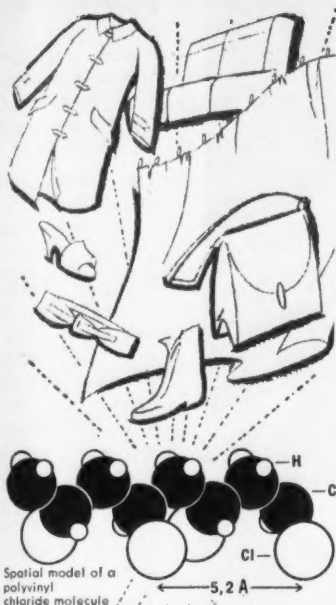
COLORS & PIGMENTS

**C. K. WILLIAMS & CO.**  
Emeryville, Cal., E. St. Louis, Ill., Easton, Penna.

Check 4504 opposite last page

CHEMICAL PROCESSING





## plastics perfumery

In the expanding plastics world of today, vinyls are often found in end products that have close personal contact with the consumer.

Belts, purses, shower curtains, raincoats, seat covers and shoes represent an increasingly large outlet for vinyls... and in such "close-up" items malodor, caused by certain stabilizers and plasticizers, can become a definite sales deterrent. The D&O Industrial

Odorant Labs have had wide experience in the development of both masking agents and fragrance additives for the highly specialized field of plastics perfuming.

No line is offered... for each formulation and each process is different, and requires individual attention.

Whether your vinyl product requires the masking of malodor or the addition of a pleasant, sales stimulating fragrance... the D&O Labs are equipped to provide it for you, tailor made! Consult D&O.

"Essentially for you"



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Sales Offices in Principal Cities

Essential Oils • Aromatic Chemicals • Seasonings  
Perfume Bases • Flavor Bases • Dry Soluble

Check 4505 opposite last page

## CHEMICAL MATERIALS

velop a practical means of dispersing the ultraviolet inhibitor into the polyethylene, which is produced continuously.

The outdoor formulation is at present available in red, orange, yellow, blue, and two shades of green, as well as natural color.

(Polyethylene compound is available from Eastman Chemical Products, Inc., Subsidiary of Eastman Kodak Co., 260 Madison Ave., New York 16, New York.)

Check 4506 opposite last page.

### Odorless epoxy resin has longer pot life, resists heat better

**Uses:** For critical applications in laminating and electrical encapsulating where low viscosity and uniformity are required.

**Features:** Odorless resin is said to have longer pot life and greater heat resistance. Resin clarity is expected to open new field for epoxy where full advantage of toughness and corrosion resistance could not previously be taken because of the yellow or amber color of conventional resins.

**Description:** Water-white liquid epoxy resin is monomeric diglycidyl ether of Bisphenol-A rather than a conventional mixture of polymers.

(D.E.R. 332 is product of Dow Chemical Company, Midland, Michigan.)

Check 4507 opposite last page.

### Chemicals, solvents guide

Bulletin of eight pages presents chemical formulas and test results on alcohols, esters, glycols, ketones, chlorinated solvents, plasticizers, and miscellaneous solvents. Featured is a solvent resin guide. "Amesco Chemicals — Building Blocks For Industrial Progress" — American Mineral Spirits Company, Mountain Ave., Murray Hill, N.J.

Check 4508 opposite last page.

... a colorless,  
spontaneously flammable  
liquid organoboron  
compound, useful as an  
igniter and Ziegler-type  
catalyst—

## TRIETHYLBORANE

Triethylborane,  $(C_2H_5)_3B$ , is a colorless liquid, miscible with most organic solvents. Available now in experimental quantities, Triethylborane is a Lewis acid and forms complexes with ammonia and amines.

Spontaneously flammable, its vapors ignite in oxygen at partial pressures below 1 mm. at  $0^\circ C$ . Suggested uses include: as a Ziegler-type catalyst; as an igniter; as a jet fuel or fuel component because of its unusual combustion properties. Other alkyl boranes can be made. If you expect that a particular compound might interest you, we would like to hear from you. For more information on Triethylborane, write for Technical Bulletin C-310.



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**GALLERY**  
CHEMICAL COMPANY  
PITTSBURGH 37, PENNSYLVANIA

Check 4509 opposite last page

... a mildly alkaline solid;  
intermediate, catalyst,  
corrosion inhibitor—  
**SODIUM METHYL  
CARBONATE**

Sodium Methyl Carbonate,  $CH_3OCOONa$ , is practically insoluble in many organic liquids, but is remarkably soluble in ethylene glycol and in glycerine. A relatively unknown and unexplored compound, it has an unusual combination of organic and inorganic properties.

Applications research on Sodium Methyl Carbonate continues at our laboratories. Some present and potential uses are: as an intermediate for preparing salicylates, ethylene carbonate, and benzyl carbonates; to neutralize weak acids; as a carbon dioxide source; to catalyze the alcoholysis of polyvinyl esters and glycerides; and to inhibit corrosion of anti-freeze cans. Write for Technical Bulletin C-910.

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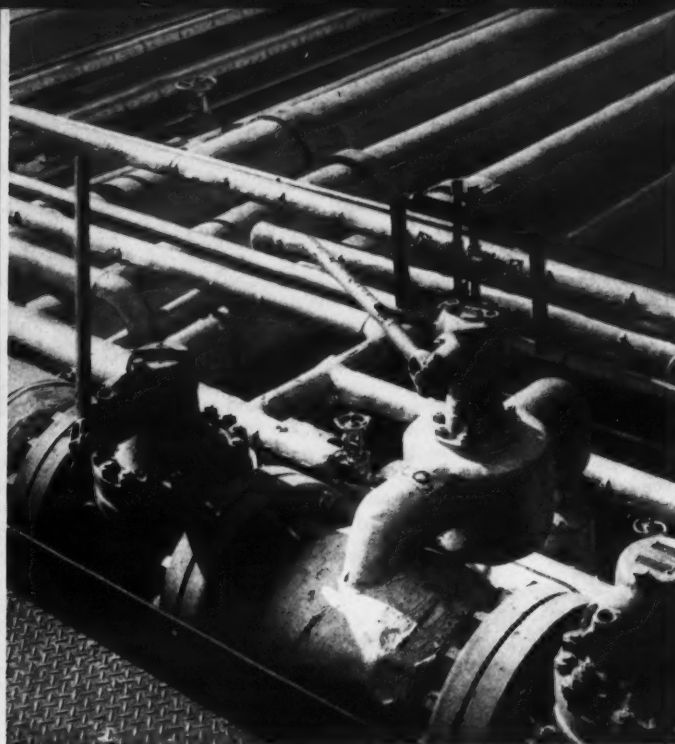
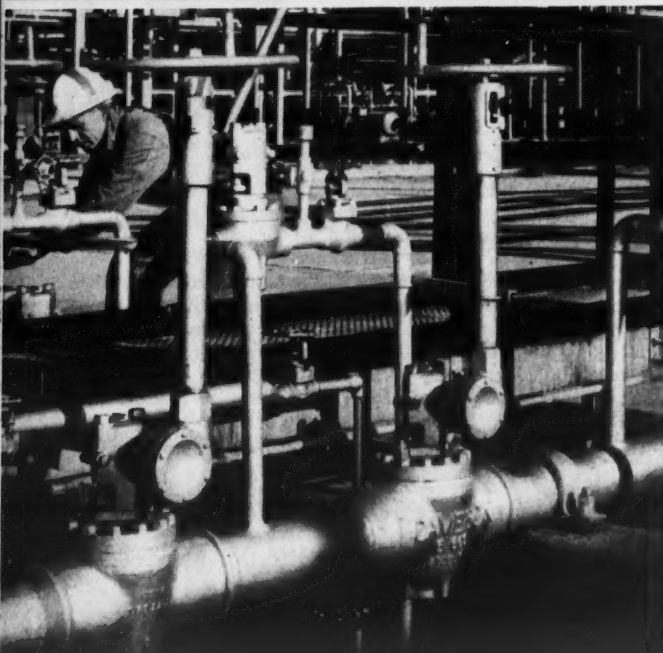
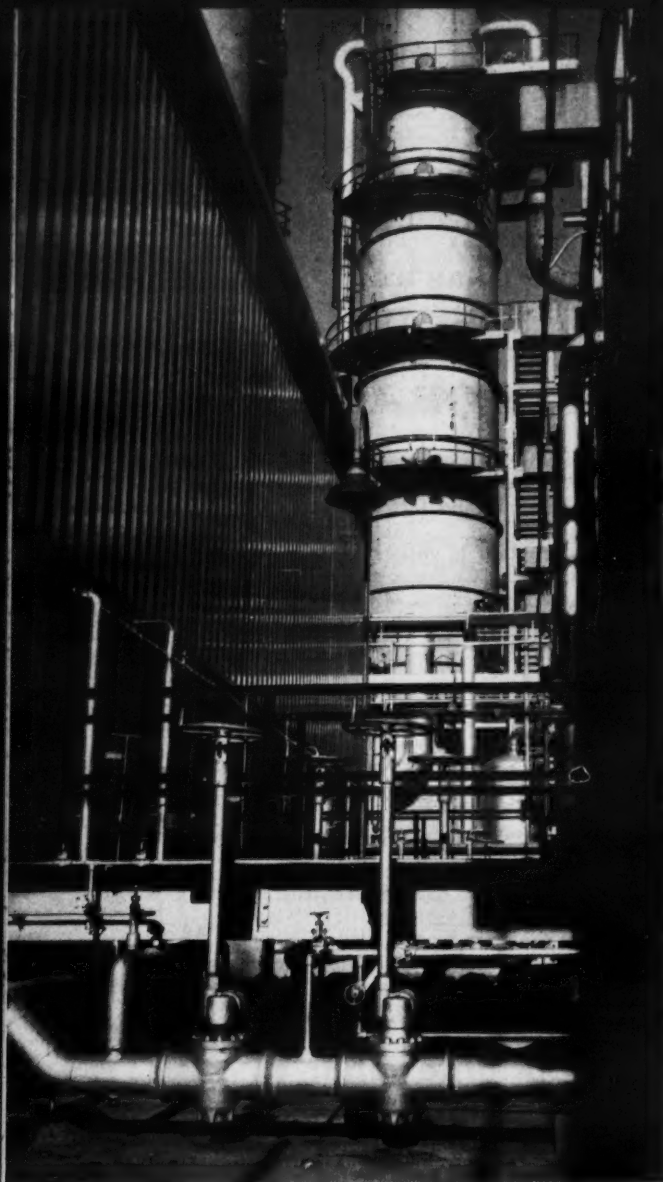


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Check 4510 opposite last page

2

3



## LIFT-PLUGS LIFT PROFITS

Because of their unique design, Cameron Non-Lubricated Lift-Plug Valves seal bubble-tight and are exceptionally easy to operate. But these are only two of their advantages. Lift-Plugs lift profits because they require no expensive lubrication program, no special lubricant inventory. This, of course, means no line product contamination and no grease deposits on orifice plates or delicate measuring instruments. They save time and money because they may be welded into the line, eliminating flange costs and the possibility of leaks. When repairs are finally necessary, Lift-Plugs can be made as good as new without removing them from the line. If you are not already enjoying these unusual benefits, call on Cameron to lift profits with Lift-Plugs.

These are Lift-Plug installations at the Delaware Refinery of Tidewater Oil Company.

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Your application is welcomed.

For more information on product at left, specify 4511 see information request blank opposite last page.



**Silicone intermediate  
improves properties  
of paint resins**

**Uses:** For combining chemically (copolymerizing) with most paint resins including alkyds, polyesters, phenolics, epoxies, epoxy esters, cellulose, polyols, and partial glycerides.

**Features:** Finished films have improved color and gloss retention, weatherability, moisture resistance, heat stability, and wet and dry electrical properties.

**Description:** Silicone intermediate is shipped in form of dry transparent flakes. Produces easier resin polymerization by making more precise concentrations possible, and by eliminating a potential subsequent solvent removal step. It also lends added lubricity during pigment grinding.

Either solvent or fusion processing may be used. No special equipment or handling is required.

(Z-6018 silicone intermediate is available from Dow Corning Corp., Midland, Mich.)

Check 4512 opposite last page.

**Resin curing agent ups  
heat distortion points**

**Uses:** As a curing agent for epoxy resins.

**Features:** Agent raises heat distortion points and gives good electrical and chemical properties.

**Description:** Curing agent for epoxy resins is an easily handled form of MDA, methylene dianiline. It is a solid that can be converted to a liquid by heating to 80°C. It will remain a liquid for several days if held at temperatures between 35 and 40°C. Tests show the chemical is a true crosslinking or curing agent, rather than a catalyst, when used with epoxy plastic resins.

(Tonox-PL is available from Naugatuck Chemical div., United State Rubber Company, 1230 Avenue of the Americas, New York 20, N.Y.)

Check 4513 opposite last page.

# BIOPAL VRO-20

IODOPHOR CONCENTRATE

CONTAINING 20% AVAILABLE IODINE

IODINE  
in a  
NONIONIC

for  
compounding

## Advantages—

OFFERS THE FORMULATOR AN IODOPHOR CONCENTRATE SUITABLE FOR THE MANUFACTURE OF CONSUMER PRODUCTS HAVING THE FOLLOWING DESIRABLE PERFORMANCE PROPERTIES:

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Compatible with Cationics,  
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No Poison Label Required

Adding Nonionic increases  
Germicidal Detergency

Write today (on your company's letterhead) for a sample of BIOPAL VRO-20 and a copy of our new FORMULATORS' MANUAL.

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RINSES

SANITIZING  
CLEANERS

GERMICIDAL  
RINSES

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SANITIZERS

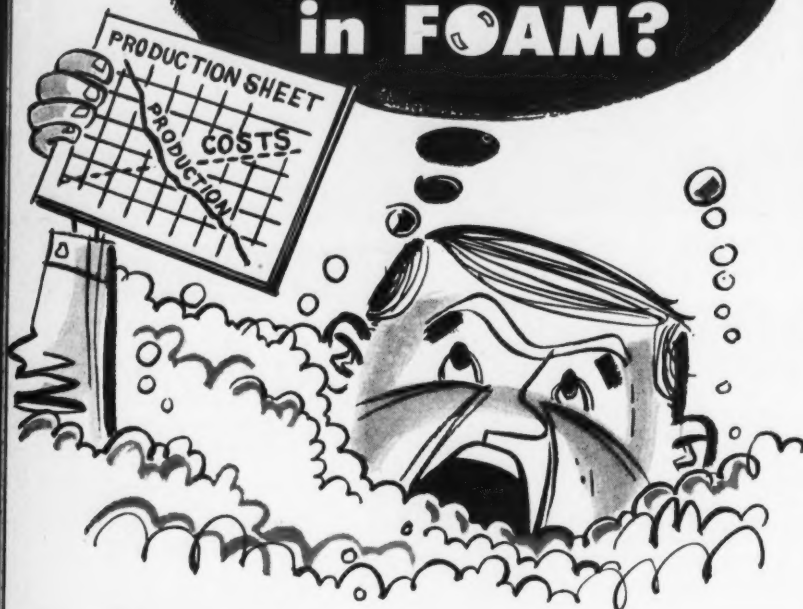
STERILIZING  
AGENTS



Check 4514 opposite last page



**up to  
your ears  
in FOAM?**



**then change  
to a Dow Corning SILICONE DEFOAMER**

**1 OUNCE KILLS FOAM IN:**

**250,000 lb** **125,000 lb**

molasses, vat dye solution, trioxide  
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phenolformaldehyde, urea formalde-  
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**62,500 lb**

soft drinks, 70% caustic liquor, black  
liquor, sulfuric acid pickling bath

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first in  
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MIDLAND, MICHIGAN

NAME _____		324 <i>My foamer is</i>
TITLE _____		
COMPANY _____		
CITY _____	ZONE _____ STATE _____	
Oil system _____ Aqueous system _____ Food products _____ Other _____		

Check 4515 opposite last page

**CHEMICAL MATERIALS**

**Antimony sulfide,  
barium nitrate  
for ceramics**

Antimony sulfide can be used to make cloudy amber or ruby opal glass, in adhering white enamel to steel, and to produce mottled gray effects in enamels and holloware. Purity: 98%  $\text{SB}_2\text{S}_3$ .

Barium nitrate, is used in making TV tubes, optical glass, and in enamels to replace alkali nitrates. It attacks melting vessels much less than the carbonate. Purity: 99.5%  $\text{Ba}(\text{NO}_3)_2$ .

Both are supplied in 100, 200, and 325 mesh granulations.

(Antimony sulfide and barium nitrate are products of Hummel Chemical Co., Inc., 90 West St., New York 6, New York.)

Check 4516 opposite last page.

**Refractories for use  
in 3000°F range**

Two materials which exhibit outstanding high-temp strength, corrosion and oxidation resistance, and are unaffected by air at temp up to 3000°F, are molybdenum disilicide and silicon nitride. The refractories come as powders, as dry mix, and in shapes.

( $\text{MoSi}_2$  and  $\text{Si}_3\text{N}_4$  are products of Electro Metallurgical Co., Div. of Union Carbide Corp., PO Box 268, Niagara Falls, N. Y.)

Check 4517 opposite last page.

**Organic solvents**

Packed into this easy-to-read 64-page handbook is detailed information on approximately 100 of the most commonly used solvents of industry: hydrocarbons, alcohols, esters and ketones, and chlorinated solvents. Sections on testing, terms, and safety are included in this pocket-size book. "Organic Solvents, 1958 Edition" — Central Solvents & Chemicals Co., 2540 W. Flournoy St., Chicago 12, Ill.

Check 4518 opposite last page.

**Mono  
Laurates  
Di**

of  
*Diglycol*

*Ethylene Glycol*

*Diethylene Glycol*

*Polyethylene Glycol*

*Propylene Glycol*

*Polyoxyethylene*

*Butoxyethyl*

*Glycerine*

**MADE TO MEET YOUR SPECIFICATIONS**



THE FLAME AND THE FLASK — SYMBOL OF QUALITY

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CHEMICAL MANUFACTURERS

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Check 4519 opposite last page

**CHEMICAL PROCESSING**

## Develop Nitrile Rubber that RESISTS Ozone Cracking

TABLE I

### Recipe for Ozone-resistant Nitrile Rubber Compound

Hycar 1072	100
NBS stearic acid	1
Sulfur	1.5
FEF black	10
TMTM (Unads)	0.4
NBS zinc oxide	5
<i>n,n'</i> -Diocetyl- <i>p</i> -phenylene diamine (UOP-88)	2
Wax (Atlantic 1115)	2
	<u>121.9</u>

The properties that make nitrile rubber of value in many specialized uses are its superior oil resistance, good flexibility, high strength, and exceptional resistance to abrasion and oxidation.

Now a nitrile rubber has been developed which is unaffected by exposure to ozone over extremely long periods, even when the compounds are soaked in hot oil before ozone exposure.

This added plus value suggests several applications — electrical insulation, fabric coatings for both indoor and outdoor use, gasoline hose covers, and oil-resistant molded rubber products that resist low temperatures, hot tear, and abrasion.

#### What It Is

Called Hycar 1072, the compound is a low-temperature polymerized, medium-high acrylonitrile copolymer, modified by addition of carboxyl groups. It is compatible with vinyl and phenolic resins.

Even though 1072 is ozone-resistant by itself, addition of antiozonants gives further improvement.

An additional increase in ozone resistance is noted if the specimens have been aged in oil before the ozone exposure tests.

In truckload volume, cost of Hycar 1072 is 64c per pound. This cost is 13c per pound higher than the similar nitrile rubber (Hycar 1042) that has not been modified with carboxyl groups. Specific gravity of 1072 is 1.00. It is supplied in slab form.

A suggested formulation, and its physical properties after cure, are given in the tables. Standard milling techniques were used.


(Hycar 1072 nitrile rubber is a product of B. F. Goodrich Chemical Co., 3135 Euclid Ave., Cleveland 15, Ohio.)

Check 4520 opposite last page.

TABLE II

### Original Physical Properties (after 30' cure at 310°F) (Test per ASTM D-412, die C)

Ultimate tensile strength (psi)	3270
Ultimate elongation (%)	480
Modulus (psi @ 300% elongation)	1180
Hardness (Duro A)	72
Compression set (ASTM "B", 70 hr @ 212°F, % Block cured 45 min @ 313°F)	45
Ozone resistance (25 pphm @ 120°F under 20% stretch) after 190.5 hours exposure	No cracks
After aging 70 hr @ 212°F in ASTM oil No. 1 before giving 190.5 hours exposure	No cracks

"NOSEY"  says:

DOES the manufacture, sale or use of plastic products or materials concern you? And, if so, do you ever have to contend with a certain little problem of odor? Because unpleasant odors have been a source of considerable annoyance to the plastic industry, FRITZSCHE has done a lot of work toward their elimination. Much of this they've neatly summarized in "PLASTIC ODORANTS," a pamphlet you can have for the asking.

**FRITZSCHE**  
*Brothers, Inc.*

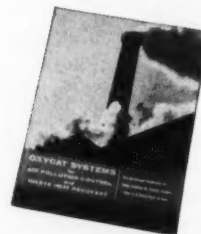


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BRANCH OFFICES and \*STOCKS: Atlanta, Ga., Boston, Mass., \*Chicago, Ill., Cincinnati, O., \*Los Angeles, Calif., Philadelphia, Pa., San Francisco, Calif., St. Louis, Mo., Montreal and \*Toronto, Canada and \*Mexico, D. F. FACTORY: Clifton, N. J.

Check 4521 opposite last page

## HOW OXY-CATALYST SYSTEMS STOP INDUSTRIAL AIR POLLUTION—RECOVER WASTE HEAT



New brochure gives facts and figures on typical installations—send for your free copy now!

Oxy-Catalyst Systems for air pollution control and waste heat recovery are one of the most important and most effective solutions to these problems ever developed. Engineered to your individual requirements, they can clean up close to 100% of combustible pollutants and odors. They can also recover the waste heat in process exhaust gases; and they can often do both at once.

This new brochure tells how Oxy-Catalyst installations have stopped air pollution—often at an actual saving—in a wide range of industries. If air pollution is a problem in your operations, write for your free copy now.



**OXY-CATALYST, INC. WAYNE 7, PA., U.S.A.**

Catalysts for fume and odor elimination, air pollution control, and waste heat recovery

Please send me your new brochure on Oxy-Catalyst Systems for air pollution control and waste heat recovery.

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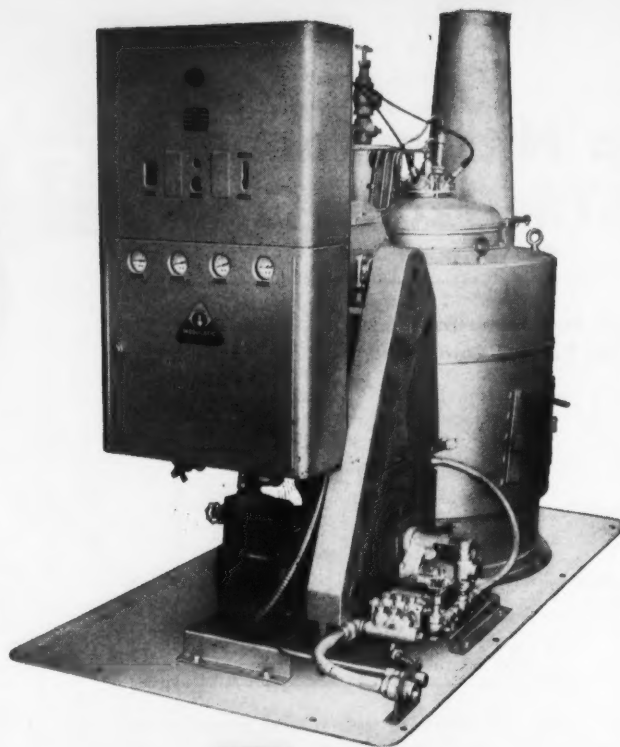
Zone

State

Check 4522 opposite last page



Modulatic needs no enclosure, special foundation, expensive stack. It's shipped fully assembled—just connect and fire up. Base plate, upon which the 60-h.p. unit shown at right is delivered, measures only 4' x 7'.

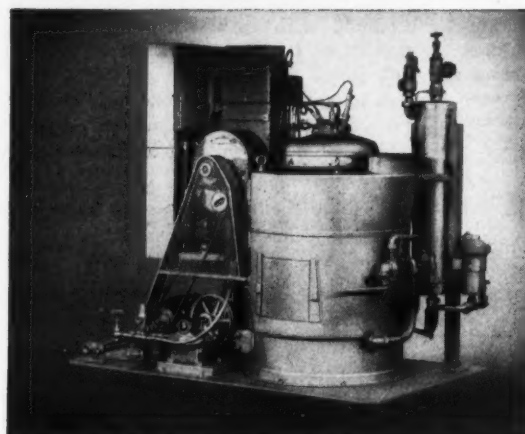


# MODULATIC

...world's most compact water tube boiler

**Takes No More Space Than A Desk and Chair!** This pocket-size power package does a "big-boiler" job to solve your steam problems. Compact, complete, it fits anywhere . . . in unused corners, aisles, balconies . . . to provide all the steam you need, where you need it, when you want it. Fully automatic, push-button operation—set controls for pressure desired . . . Modulatic does the rest. Saves fuel—steam produced only "on demand". Clean, quiet operation . . . practically no maintenance. And for large steam requirements, multiple installations provide same steam capacity, in far less space, than conventional boilers. Single, coordinated control cuts individual units in and out to meet changing steam demands . . . far more economically and efficiently than idling larger boilers.

Ask for free 12-page Modulatic Bulletin No. 586



Sizes range from 10 to 160 h.p.; pressures from 5 to 300 p.s.i. and much more, if required. Maximum floor load, only 150 lbs./sq. ft. Choice of oil, gas, or combination burner. Steam from cold starts in 2 minutes ends early reporting and standby.

**VAPOR HEATING CORPORATION**  
80 East Jackson Boulevard • Chicago 4, Illinois  
Offices in principal cities

Check 4523 opposite last page

## CHEMICAL MATERIALS

**Effective insect repellent, developed by Army, now available**

Diethyltoluamide, an insect repellent developed by the Army Quartermaster research laboratories and the USDA, is now being produced. DET is said to be the most effective repellent yet developed for use against mosquitoes, deer flies, ticks, chiggers, fleas, and many other insects.

Manufacturer has conducted research and development work on DET for over a year, and is now manufacturing product with minimum meta isomer content of 95%.

(Detamide 95 is available from Cowles Chemical Co., 7016 Euclid Ave., Cleveland 3, Ohio.)

Check 4524 opposite last page.

## Describes electrochemicals

Physical properties of 23 products — borides, carbides, nitrides, and fused oxides — are described in 16-page bulletin. Bul 2152 — Norton Company, Worcester 6, Mass.

Check 4525 opposite last page.



"Simplest scale-up we've ever made."

Thanks to an idea by Edward L. Wolfe, Rohm & Haas Company, Philadelphia, Pa.

## CHEMICAL PROCESSING



**Sodium gluconate,  
gluconic acid —  
sequestrants**

Sodium gluconate (99+ % technical and purified grades) and gluconic acid (50% technical grade) are now being produced by manufacturer. Products are used as sequestrants in cleaners, corrosion inhibitors, textiles, paint strippers, etc.

(Gluconate products are produced by Dawe's Laboratories, Inc., 4800 S. Richmond St., Chicago 32, Ill.)

Check 4526 opposite last page.

**Blends urethane plastic  
with vegetable oil in  
single, stable resin**

**Uses:** As resin for paint and varnish vehicles.

**Features:** Resin combines many advantages of urethane plastic with vegetable oil in a single, stable resin. In coatings, resin results in rapid drying, extreme surface hardness, excellent resistance to boiling water, caustic, gasoline, and certain acids, good flexibility, high impact resistance, and excellent mar resistance.

**Description:** Polyurethane 101 is a single resin, and can be handled and stored like other paint resins. It does not have to be mixed from two components at time of application nor applied under heat and pressure.

(Polyurethane 101 is a product of Cargill, Inc., 200 Grain Exchange, Minneapolis 15, Minnesota.)

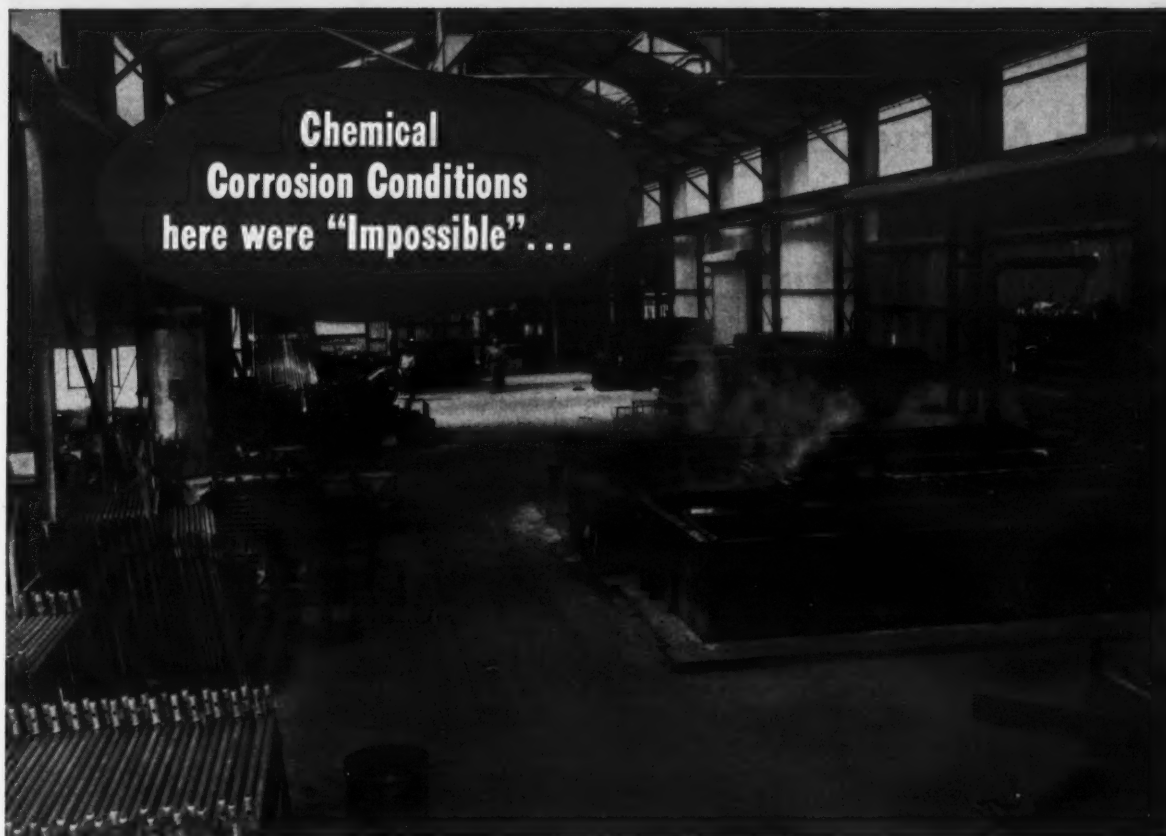
Check 4527 opposite last page.

**Low-cost plasticizer**

First of a series of low-cost hydrocarbon resins for plasticizing and extending vinyl compounds has been introduced.

(Bearflex 1751 is a product of Chemicals Div., Golden Bear Oil Co., 325 W. Eighth St., Los Angeles 14, Calif.)

Check 4528 opposite last page.



**Chemical  
Corrosion Conditions  
here were "Impossible"...**

**But TARSET® Stopped the Attack!**

**T**HE extreme corrosion conditions found in this metal finishing plant are seldom surpassed! Pickling and plating equipment, as well as structural steel, is under constant attack from fumes and spillage of sulphuric, nitric and chromic acids and cadmium and zinc salts. After several other protective materials failed, Pitt Chem *Tarset* was applied and stopped corrosion in its tracks.

No other protective coating on the market today offers you the broad corrosion-resisting

properties and relatively low cost of this unique and patented Coal Tar-Epoxy Resin coating.

Wherever the going is roughest—on storage tanks, precipitator tanks, material conveyors and similar chemical plant equipment—you'll find *Tarset* is the recommended coating.

If you have a stubborn corrosion problem that you've labeled as economically "impossible" to control, it will pay you to investigate *Tarset*. Send today for complete technical data and samples for testing.

*Think First  
of the Coatings  
that Last!*

**PITT CHEM**  
Coal Tar Coatings  
**PITT CHEM**  
"Insul-Mastic" Gilsenite Coatings  
**PITT CHEM**  
"Tarset" Coal Tar  
Epoxy Coating

PITT CHEM Industrial Coatings are available through leading Industrial Distributors. See the "Yellow Pages."



COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Check 4529 opposite last page

# Do you generate your own inert gases?

**Using Mathieson CO<sub>2</sub> may be cheaper, cleaner, safer and more efficient**

## GENERATING YOUR OWN INERTS

Unless precise metering of fuel is maintained at all times, carbon monoxide may be produced, or all the oxygen may not be consumed.

Produces large amounts of water vapor, necessitating driers.

Where inerts are needed under pressure, a compressor must be used.

Reserve storage is a problem in case of stoppages in the generator. Small amounts of generated inerts can be stored, but only as a compressed gas.

Sulfur compounds and other contaminants may appear, due to fuel used.

Gas generators are slow to get into action... very inflexible.

Generators are expensive to buy, operate and maintain while replacement costs are very high.

Gas generators consume valuable floor space.

Operation may create fumes, dirt, toxic gases.

Carbon dioxide's wide range of inerting applications are only beginning to be utilized. Although it cannot be used in all inerting applications, CO<sub>2</sub> is nonetheless finding a steadily increasing market where elemental inerts — argon, nitrogen, etc. — have previously been used.

Compare the advantages of Mathieson CO<sub>2</sub> with the problems involved in generating your own inerts by burning out the oxygen in air to arrive at nitrogen plus carbon dioxide. Then contact your Olin Mathieson representative for full details.

## USE OF MATHIESON CO<sub>2</sub>

No metering of fuel required at all. Mathieson CO<sub>2</sub> is uniformly pure at all times.

No water vapor present. No driers needed.

CO<sub>2</sub> has high vapor pressure at all times.

Your supply of CO<sub>2</sub> is unaffected by stoppages in equipment or in fuel supply. Large amounts of CO<sub>2</sub> are stored as a liquefied gas.

Mathieson CO<sub>2</sub> is uniformly pure at all times.

CO<sub>2</sub> is available instantly at all times.

Use of Mathieson CO<sub>2</sub> eliminates generators and all their associated expense.

Use of Mathieson CO<sub>2</sub> requires little floor space or none at all.

No fumes, no dirt, no toxic gases.

### HERE ARE THE FORMS IN WHICH MATHIESON CO<sub>2</sub> IS AVAILABLE

Size Storage	CO <sub>2</sub> Vapor Volume, 100% Basis, 70°F
50 lb. cylinder	440 cu. ft.
150 lb. converter	1,319 cu. ft.
300 lb. converter	2,637 cu. ft.
1,000 lb. converter	8,790 cu. ft.
4 ton receiver	70,320 cu. ft.
6 ton receiver	105,480 cu. ft.
24 ton car*	421,920 cu. ft.
30 ton car*	527,400 cu. ft.

\*For direct unloading to your process.



## MATHIESON CHEMICALS

OLIN MATHIESON CHEMICAL CORPORATION  
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

### HERE ARE SOME OF THE IMPORTANT CHARACTERISTICS OF CO<sub>2</sub> VAPOR

Molecular weight	44.004
Specific Gravity	1.527 (when air equals 1) 1.557 (when N <sub>2</sub> equals 1)
Absolute density	0.114 lb./cu. ft. @ 70° F.
Thermal conductivity	0.590 (air equals 1)
Specific heat	0.19 to 0.21 BTU/lb.
Volume, cu. ft./lb.	8.79 @ 70° F.
Pressure, saturated	852.5 psia @ 70° F.
Cost, 100 cu. ft.	\$0.455 (CO <sub>2</sub> costing \$.04/lb.)

## CHEMICAL MATERIALS

### Adds 11 fatty nitrogen compounds to line

They make intermediates or cationic surface-actives

Eleven fatty nitrogen compounds are added to line of cationic surface-actives and intermediates. Seven fatty amines (manufacturer's Alamine series) are: Two grades of primary lauryl amines, palmityl amines, cottonseed amines, and one soya amine. Distilled coco trimethylene diamine (Diam 21D) and three trimethyl ammonium chlorides (Aliquats) — lauryl, palmityl, and coco — are included.

(Alamines, Diams, and Aliquats are products of Chemicals Div., General Mills, Inc., Kankakee, Ill.)

Check 4531 opposite last page.

### Quaternary ammonium compound duo

Emcols E607 and E607S are quaternary ammonium compounds suggested for use as non-irritating germicides, deodorants, or cationic emulsifiers. E607 is N(lauroyl colamino formyl-methyl) pyridinium chloride. E607S is the stearyl (instead of lauroyl) product.

(Emulsol Chemical Corp., Div. of Witco Chemical Co., 75 E. Wacker Dr., Chicago 1, Ill.)

Check 4532 opposite last page.

### Vinyl-acrylic emulsion ups strength, quality of publication paper

**Uses:** In addition to developing excellent film strengths and printing qualities in publication grades of paper, this resin latex is also adaptable for use in protective coatings.

**Features:** Coating resin possesses excellent film flexibility and strength. It has low viscosity, superior pigment-bonding ability, excellent film clarity, and good mechanical stability. Dried film is odor-free.

5980

Check 4530 opposite last page

**Description:** Resyn 2203® is a vinyl-acrylic coating emulsion. It has a strong affinity for cellulose fiber, which can give a firm anchoring to the coating substrate. It can be used with all types of coated paper. For example, with off-set papers, coating strength and wet rub resistance are substantially increased.

(Resyn 2203 is a product of National Starch Products Inc., 270 Madison Ave., New York 16, New York.)

Check 4533 opposite last page.

**US-produced geraniol of high uniformity, regular supply**

**Uses:** In perfumery.

**Features:** Product is synthesized from domestically produced turpentine. It has a uniform high purity, regularity of supply, and price stability.

**Description:** Available in quantity, geraniol has a minimum total alcohol content of 98%. It is free from terpenes and sesquiterpenes.

(Geraniol is product of Southern Chemical Div., The Glidden Co., PO Box 389, Jacksonville 1, Fla.)

Check 4534 opposite last page.

**Epoxy casting resins have properties suited to mass production**

**Uses:** Casting electrical products.

**Features:** Systems are easily handled by continuous production techniques. Compounds have long pot life, low viscosity, are non-settling. Final products resist thermal shock, have good electrical properties.

**Description:** Four new epoxy systems are designated Hysol 6905 through 6908, come both unfilled and filled and with Shore D hardnesses of 30 and 45.

(Hysol epoxies are products of Houghton Laboratories, Inc., Olean, N. Y.)

Check 4535 opposite last page.

# BRIEFS for buyers of

Caustic Potash  
Lauryl Mercaptan  
Benzyl Chloride  
Chlorine

**13 ways to buy caustic potash**

If you're using caustic potash at all, you're probably using the "liquid regular" form, 45% to 52% strength.

Besides being easier to handle than solid forms, liquid KOH is generally cheaper to buy—except where freight charges on the water of solution exceed the differential in price.

However, for cases where you require a different form or grade, we offer you these 12 alternatives as well:

- Solid; flake; granular; broken; crushed; powder; walnut—all at 90% strength.
- Solid and flake, at 85% strength.
- Liquid, low-chloride—45%.
- Solid or flake, low-chloride—both 85%.

Some of these forms are tailored to meet the needs of a particular industry or even an individual customer.

Because of this specialization, you stand a better chance of getting just what you want when you specify NIALK® caustic potash.

For complete information on all forms and grades, check the coupon. Check also for bulletin describing physical properties, process of manufacture, uses, shipping and handling methods.

**That new intermediate you need may be hiding in our woodpile**

In this complex age, it can happen that the new intermediate you're seeking is closer than you think—cheaper, too.

Looking for something that has "never been made before?" Maybe it's in production already—for another use. Maybe you can get it in tank-car quantities.

Let's say you're on the trail of a new polymerization modifier. Your preliminary work indicates a mercaptan structure is desirable. It should have a freezing point below 0°C, a boiling range over 100°C. It should be a mobile liquid, light in color and with little or no odor.

Well, one compound that meets these requirements is our *lauryl mercaptan*—C<sub>12.4</sub>H<sub>25.7</sub>SH (average). A strong advantage of lauryl mercaptan is *availability*.

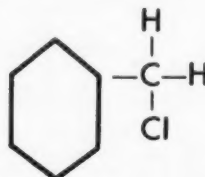
This product is one of many that helped, in a modest way, to make wartime synthetic rubber more plentiful. It's still around—still being used as a modifier in the synthetic rubber "hot"

process. We can ship it in carboys, drums, or by the tank car.

This is just one example of how checking with us might save you a costly development program, next time you need something new.

**Chloro aromatics would carload delivery save you some juggling?**

If your processing requires use of the benzyl, benzoyl, or nitrobenzoyl groups, you'll find Hooker a convenient source of supply for intermediates.



*Benzyl chloride*, for example, is available in 5-gallon and 13-gallon carboys, in 55-gallon steel or nickel drums, and, if you prefer bulk shipment, in nickel-lined tank wagon.

Other Hooker chloro aromatics you'll be interested in include:

- Benzoyl chloride
- meta-Nitrobenzoyl chloride
- para-Nitrobenzoyl chloride

All are uniformly high in purity. The *meta*- and *para*-nitrobenzoyl chlorides are available in commercial quantity

only from Hooker. You can have as little as a 5-gallon container or as much as a carload delivered promptly.

If you'd like to know more about any of these compounds, check the coupon for technical data sheets.



**New wall chart helps you handle chlorine safely**

A useful adjunct to your plant safety program is this new Hooker chlorine wall chart.

It can help prevent accidents by showing your employees the most important do's and don'ts for handling chlorine. In concise, easily understood language, it explains the operation of tank car, ton container, and cylinder valves; describes safe storage methods; and tells what to do in an emergency.

If you'd like a copy of the chart for posting, ask your Hooker salesman or check the coupon.

**For more information on chemicals mentioned on this page, check here:**

- |  |   |
|--|---|
| <input type="checkbox"/> Caustic potash (data sheet)           | <input type="checkbox"/> Benzoyl chloride           |
| <input type="checkbox"/> Caustic potash (descriptive bulletin) | <input type="checkbox"/> Benzyl chloride            |
| <input type="checkbox"/> Lauryl mercaptan                      | <input type="checkbox"/> meta-Nitrobenzoyl chloride |
| <input type="checkbox"/> Chlorine wall chart                   | <input type="checkbox"/> para-Nitrobenzoyl chloride |

**Clip and mail to us with your name, title, and company address. When requesting samples, please use business letterhead.**

**HOOKER ELECTROCHEMICAL COMPANY**

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Check 4536 opposite last page



# WAS



# IS



NEW LOW PRICE OF 16¢  
**MAKES 2-NITROPROPANE**  
**YOUR #1 SOLVENT BUY!**

Price cut 24%! This reduction makes 2-Nitropropane the #1 solvent buy for more and more applications. Such as? Acrylic resin finishes, cellulose acetate butyrate, nitrocellulose, polystyrene, epoxy resins, vinyl spray formulations and paint and varnish removers.

Check your formulas. See how 2-NP fits in — at a saving. And see how it outperforms the older types of solvents which, incidentally, have been climbing higher and higher in price the past ten years. Put 2-NP superiority to work for you. Get lower viscosity, higher solids, slower evaporation rate and better flow, less solvent retention, reduced odor problems, high flash point, better

drying characteristics . . . and more economy per pound of film laid down!

Part and parcel of this substantial price cut is the big increase in production. This new schedule serves to emphasize the long-term future of versatile 2-NP in the protective coatings field. 16¢ per pound, tank car, F.O.B. plant, freight paid to destination. Make it your #1 solvent buy. Write for information on specific applications, and for detailed technical data sheets and a sample. Trained technical representatives can be reached through any CSC sales office. Let them *prove* how you can save with 2-Nitropropane.



INDUSTRIAL CHEMICALS DEPARTMENT

**COMMERCIAL SOLVENTS CORPORATION**

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Atlanta • Boston • Chicago • Cincinnati • Cleveland • Detroit • Houston • Indianapolis • Kansas City  
 Los Angeles • Louisville • Memphis • Milwaukee • Minneapolis • Newark • New Orleans • New York • Pittsburgh  
 St. Louis • San Francisco • IN CANADA: McArthur Chemical Co., Montreal • IN MEXICO: Comsolmex, S. A., Mexico 7, D. F.

Check 4537 opposite last page

## CHEMICAL MATERIALS

### **Powdered vinyl acetate ups solids content of emulsions**

**Uses:** In dry concrete mixes for patching, ups resiliency and cohesive action; improves adhesion of spackling compounds and textured paints.

**Features:** In emulsions, product increases solids content, ups bonding action.

**Description:** Vinac RD Powder is powder form of polyvinyl acetate, is readily redispersible in water.

(Vinac RD Powder is a product of Colton Chemical Co., 1747 Chester Ave., Cleveland 14, Ohio.)

Check 4538 opposite last page.

### **Aluminum paint resin is stable, non-gassing improves leafing**

**Uses:** For aluminum paints.

**Features:** Provides improved retained leafing, can-stability, is non-gassing, and has excellent tolerance for ordinary petroleum thinners. Material is compatible with drying oils, bodied oils, alkyds, and oleoresinous varnishes, and in solution form it can be "cold-cut" into these media.

**Description:** Polyindene resin is produced in flaked, solid, or solution form.

(Picco Resin 420-ES is product of Pennsylvania Industrial Chemical Corp., Clairton, Pennsylvania.)

Check 4539 opposite last page.

### **Silicone adhesive — easily applied and strong**

**Uses:** Bonding vulcanized silicone rubber parts; bonding silicone rubber to common metals.

**Features:** Material is easily applied and has high bond strength. No special surface preparation is required beyond normal cleaning.

**Description:** Silicone rubber adhesive vulcanizes to create a strong bond in only five



DISCOVER THE SAVINGS IN THE NITROPARAFFINS!

minutes at 240-270°F. However, optimum adhesion to metal requires a cure of almost four hours at about 480°F under firm contact pressure.

Tests indicate that cured film develops strengths in the order of 25 lb pull per inch width, and retains both mechanical strength and full resilience at temperatures ranging from -70 to 500°F.

Silicone rubber adhesive is currently available in pilot plant quantities, at a price comparable to that of conventional silicone rubbers.

(Silastic Adhesive S-2200 is product of Dow Corning Corp., Midland, Mich.)

Check 4540 opposite last page.

#### 'Foam-in-place' polyester resin for urethanes

**Uses:** To make rigid urethane foams for heat insulation and sound proofing.

**Features:** Resin is capable of being "foamed-in-place" to form an integral part of structure. Foam is rigid and has outstanding strength, and good aging characteristics. It has high moisture resistance and excellent insulation properties.

**Description:** Polyester resin can be prepared in low density foams. Ingredient cost in such foams is 6¢ a board foot.

("Dulux" foam resin R-42 is product of E.I. du Pont de Nemours & Co., Wilmington 98, Delaware.)

Check 4541 opposite last page.

#### Soluble silicates

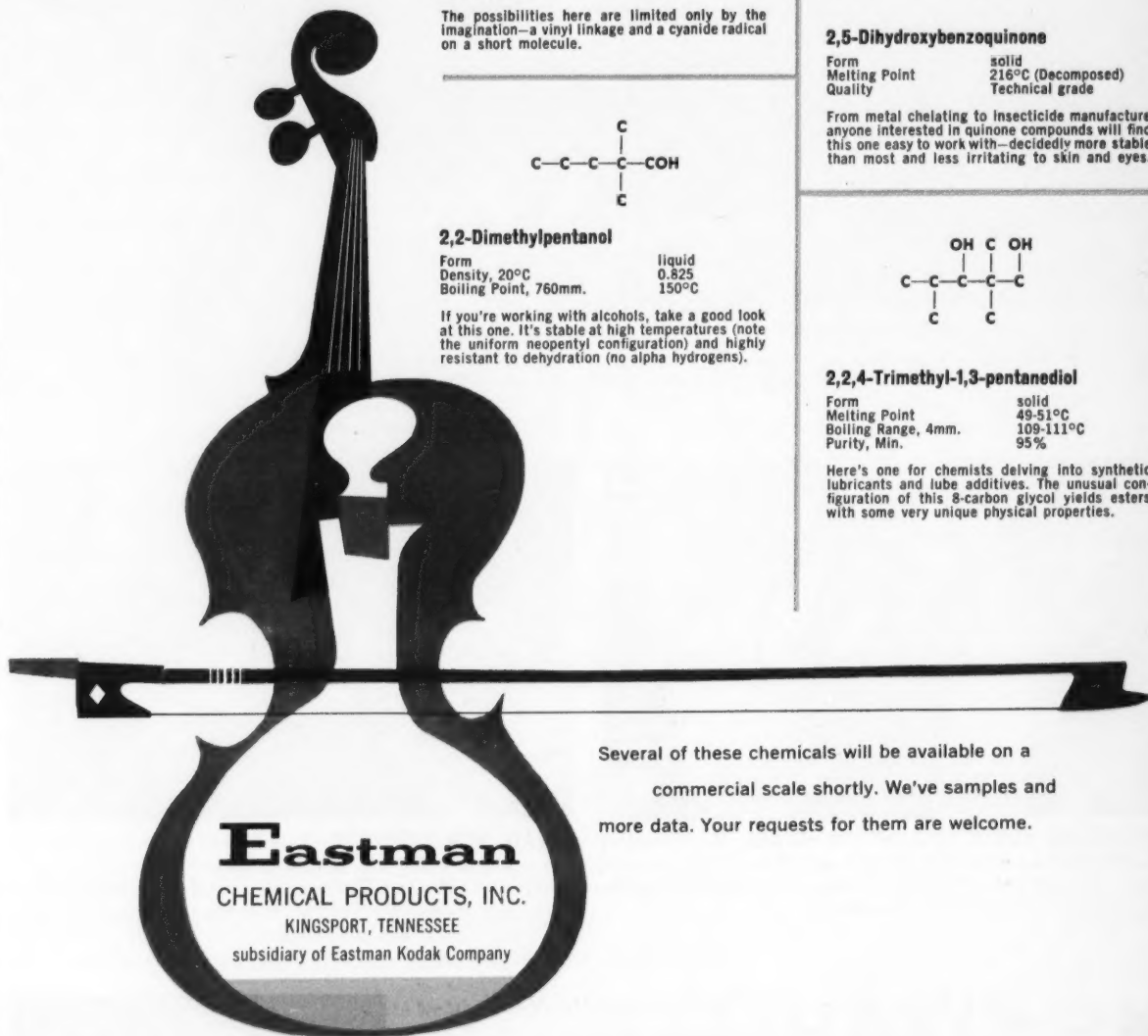
Pocket-size 16-page booklet catalogs 26 liquid and dry sodium and potassium silicates, and gives their properties, applications, and advantages. Use in adhesives, detergents and soaps, cements, sizes and coatings, and as coagulant aids in water treatment are discussed. "PQ Soluble Silicates" — Philadelphia Quartz Co., 1158 Public Ledger Building, Philadelphia 6, Pa.

Check 4542 opposite last page.

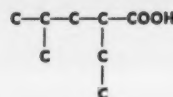
## Eastman presents some new chemicals

for

### "scientific fiddling"



**Eastman**  
CHEMICAL PRODUCTS, INC.  
KINGSPORT, TENNESSEE  
subsidiary of Eastman Kodak Company



#### 2-Ethylisohexanoic Acid

Form	liquid
S. G. 20/20°C	0.9036
Boiling Point, 738mm.	216-223.7°C
Acid, %	97.9

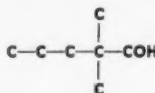
For those who are developing better paint driers, vinyl stabilizers, or plasticizers or who are intrigued with ore extractants, we recommend this branched 8-carbon acid for investigation. Its soaps make interesting gelling agents, too.



#### Methacrylonitrile

Form	liquid
S. G. 20/4°C	0.8001
Boiling Point	90.3°C

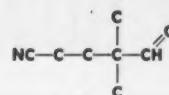
The possibilities here are limited only by the imagination—a vinyl linkage and a cyanide radical on a short molecule.



#### 2,2-Dimethylpentanol

Form	liquid
Density, 20°C	0.825
Boiling Point, 760mm.	150°C

If you're working with alcohols, take a good look at this one. It's stable at high temperatures (note the uniform neopentyl configuration) and highly resistant to dehydration (no alpha hydrogens).

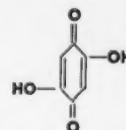


#### 2,2-Dimethyl-4-cyanobutyraldehyde\*

Form	liquid
S. G. 20/4°C	0.9647
Boiling Point, 5mm.	93.5°C

Here's a cyanoaldehyde sans alpha hydrogen. It should be ideal for reactions in alcohol, acetone, ether or benzene, while its insolubility in water or pentane could ease product separation.

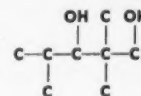
\* Patented as a composition of matter, Bruson (to Rohm & Haas Company), U. S. Patent 2,353,687, July 18, 1944.



#### 2,5-Dihydroxybenzoquinone

Form	solid
Melting Point	216°C (Decomposed)
Quality	Technical grade

From metal chelating to insecticide manufacture anyone interested in quinone compounds will find this one easy to work with—decidedly more stable than most and less irritating to skin and eyes.



#### 2,2,4-Trimethyl-1,3-pentanediol

Form	solid
Melting Point	49-51°C
Boiling Range, 4mm.	109-111°C
Purity, Min.	95%

Here's one for chemists delving into synthetic lubricants and lube additives. The unusual configuration of this 8-carbon glycol yields esters with some very unique physical properties.

Several of these chemicals will be available on a commercial scale shortly. We've samples and more data. Your requests for them are welcome.

**SALES OFFICES:** Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Massachusetts; Cincinnati; Cleveland; Chicago; St. Louis; Houston. **West Coast:** Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

Check 4543 opposite last page

# HOW **HERCULES** HELPS...

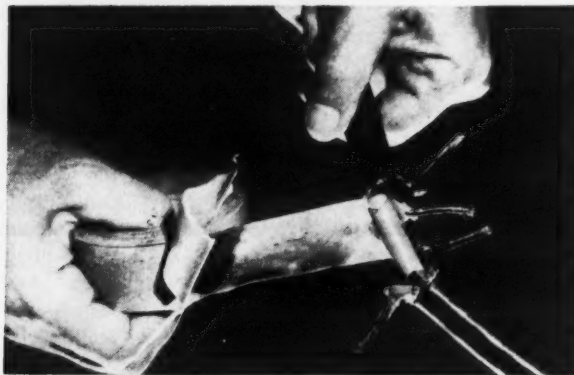


**MAINTAIN QUALITY STANDARDS**—For generations "Evenflo" baby bottles have been a recognized leader in their field. Now Pyramid Rubber Company uses Hercules Hi-fax® high density polyethylene to mold "Evenflo" plastic bottles with even more advantages. Unbreakable, of

course, Hi-fax bottles are acceptable by FDA for direct contact with food, can withstand the high temperatures necessary for sterilization. These are just a few reasons why Hi-fax is finding ever increasing use in packaging, toys, fabrics, wire coating and pipe.



**ENCOURAGE YOUTH**—Pictured with Hercules Vice President Paul Mayfield are winners in the National 4-H Entomology Awards Program. Agricultural Chemicals Division thus plays a part in the development of farm and civic leadership.



**CREATE NEW PRODUCTS**—Rubber and Asbestos Corporation depends on two Hercules tackifying agents for the unique characteristics of its new "Tackmaster" pressure-sensitive film used in the tape shown. The Hercules materials help provide the high tack, quick stick and grab necessary in such films, plus easy separation from the protective release paper.

## **HERCULES POWDER COMPANY**

INCORPORATED  
900 Market Street, Wilmington 99, Delaware

CHEMICAL MATERIALS FOR INDUSTRY

# **HERCULES**

## CHEMICAL MATERIALS

### **Emulsive driers for emulsion paints**

**Uses:** As driers for latex paints, especially finishes.

**Features:** Emulsive driers may be introduced at any stage in making oil- or alkyd-modified latex emulsion paints. When incorporated in the paints, full drier efficiency is almost instantaneous.

**Description:** Emulsive driers come in standard concentrations of 6% cobalt, 24% lead, or 6% manganese.

(Emulsive Driers are products of Witco Chemical Co., 122 E. 42nd St., New York 17, N.Y.)

Check 4545 opposite last page.

### **Lubricating oil antioxidants**

Two liquid boroesters have been tested as lubricating oil antioxidants and the results have been encouraging. Products are extremely resistant to hydrolysis and are soluble in all proportions in acetone, benzene, chloroform, and petroleum ether (20-40°C).

Boroester 29 is 2,6-di-*tert*-butylphenyl di-*n*-butyl borate and Boroester 30 is a similar compound, having a methyl group at the 4 position. Boiling points (@ 1 mm) are 150-154° and 167-171°C respectively.

(Boroesters® are products of Pacific Coast Borax Co. Div., United States Borax & Chemical Corp., 100 Park Ave., New York 17, N. Y.)

Check 4546 opposite last page.

### **Paint extender pigments**

A comparative study of aluminum silicate, calcined aluminum silicate, calcium carbonate, and medium-oil and low-oil magnesium silicate as extender pigments for lead-free, leaded zinc, and alkyd-fortified exterior house paints is given in this 14-page study. Bul "No. 208" — Minerals & Chemicals Corp. of America, Menlo Park, N.J.

Check 4547 opposite last page.



Check 4544 opposite last page



## ARE YOU LOOKING...

for more information on any of the products or services mentioned in this issue of **CHEMICAL PROCESSING**?

Then make use of the Reader Service slip opposite last page of this issue.

## It's easy...

to use and can save time. Every month you will find a number at the end of each article or advertisement. Find this number on the slip and check it.

If several items from the same manufacturer are listed in the story just write the item down in the space provided on the Reader Service slip. Don't forget to include the key number.

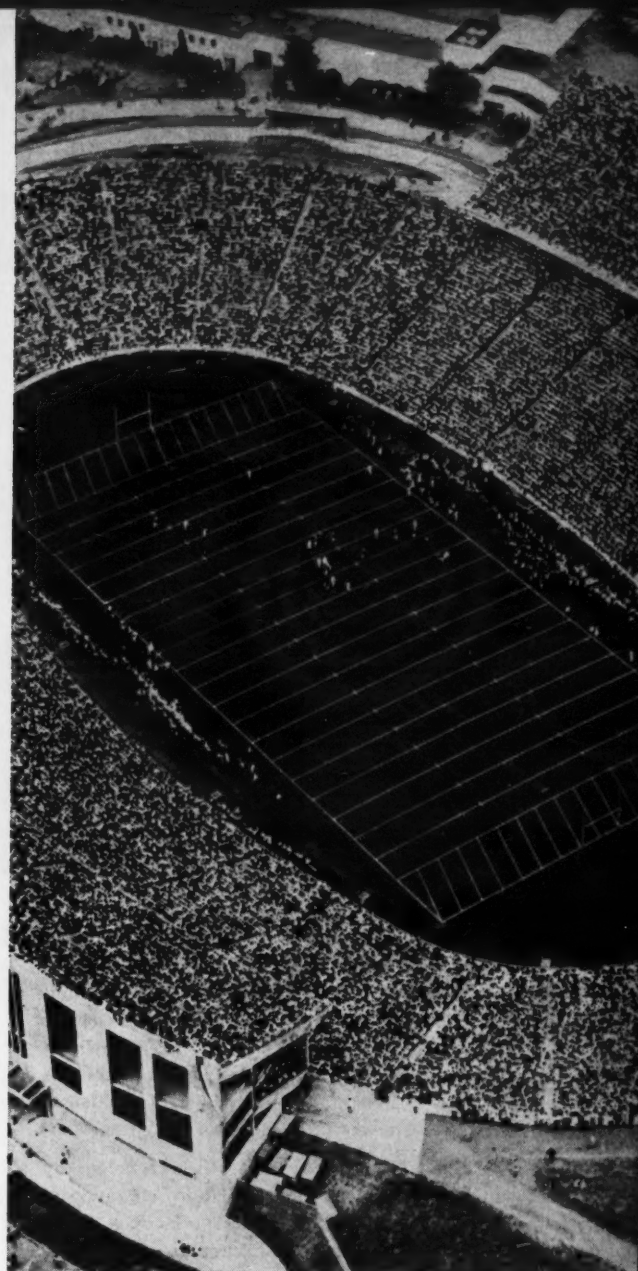
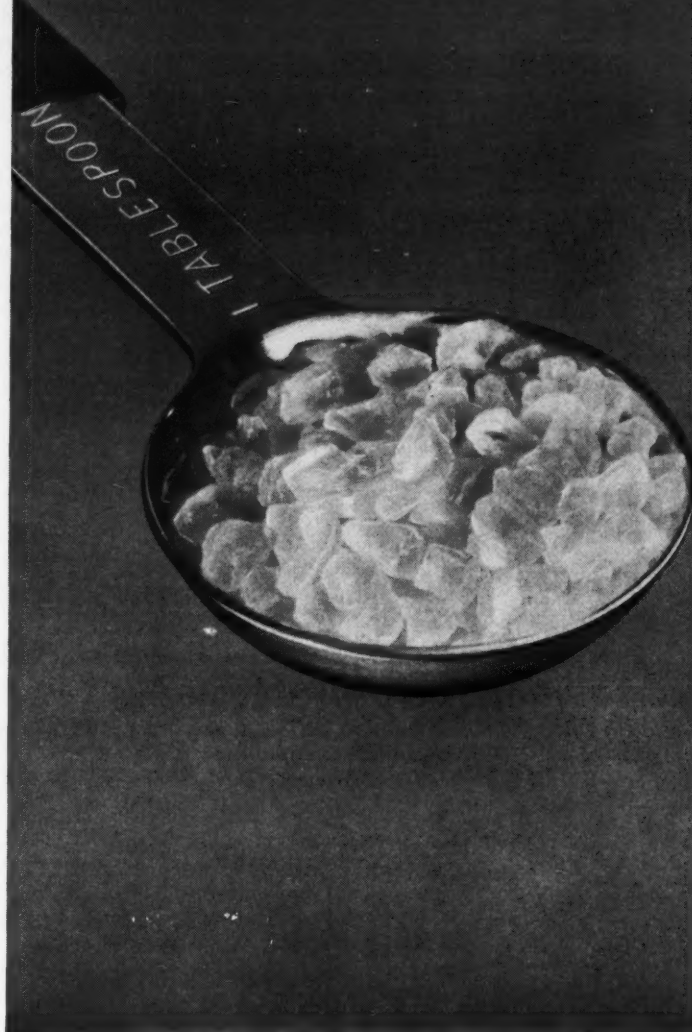
Then fill out the slip and mail it to Reader Service Department. We will contact the manufacturer for you.

Additional details will be sent direct to you.

## Be sure...

to fill in the slip with the other pertinent information: your name, title, company, product made, and address.

For more information on product at right, specify 4548 see information request blank opposite last page.



## Which has the greater surface area?

*Not the football field! One cubic inch of Davison Silica Gel boasts a surface area of about 90,000 square feet . . . much more than a football field. It's a high capacity desiccant!*

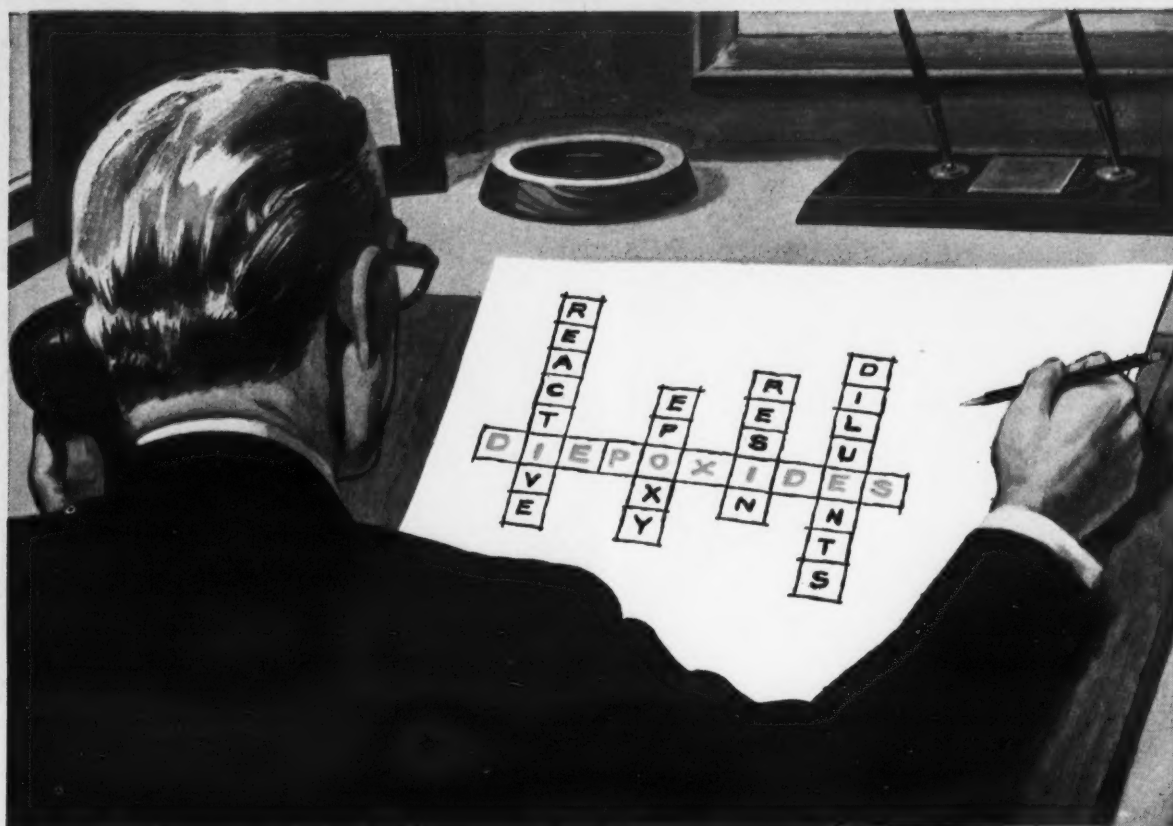
Davison Silica Gel adsorbs about 45% of its weight of water from saturated air. What makes it so vapor "thirsty"? One, its enormous internal surface. Two, its millions of tiny pores or capillaries. These attract vapors, condense them, hold them as liquids.

That's why you'll find Davison Silica Gel so efficient in drying air and gas. A variety of particle sizes, densities and adsorptive capacities are available. Each has been developed to meet specific application demands. There is one to suit yours.

**DAVISON**  
CHEMICAL COMPANY

Division of W. R. Grace & Co.  
Baltimore 3, Maryland





## Are Becco DIEPOXIDES an answer to your resin problems?

Becco's new diepoxides—Dicyclopentadiene Dioxide and Limonene Dioxide—combine the reactivity of the epoxy group with their difunctional nature. Initial Becco research indicates their principal applications will be as constituents in epoxy and other resin systems. Here they may function as diluents, crosslinking agents, or modifiers of resin properties.

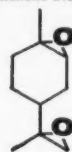
Other applications for the new diepoxides conceived by Becco chemists are as intermediates in the preparation of perfumeries, cosmetics, pharmaceuticals, adhesives, lubricants and lubricant additives, and in organic synthesis.

We invite you to write for technical information and research quantities of Dicyclopentadiene Dioxide, a white, crystalline

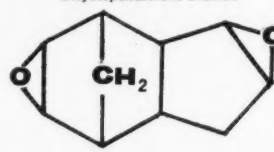
powder, or Limonene Dioxide, a clear, colorless liquid. Ask, too, for our bulletins describing Becco monoepoxides—Octylene Oxide, Dodecene Oxide,  $C_{10}$ - $C_{18}$  Olefin Oxide, alpha-

### STRUCTURES

Limonene Dioxide



Dicyclopentadiene Dioxide



Pinene Oxide and Limonene Monoxide (Dipentene Oxide)—which are available in semi-commercial quantities.

# BECCO

*Progress in Peroxygens*

**BECCO CHEMICAL DIVISION**

Food Machinery and Chemical Corporation  
Station B, Buffalo 7, New York



**FMC CHEMICALS INCLUDE:** BECCO Peroxygen Chemicals • WESTVACO Phosphates, Barium and Magnesium Chemicals • WESTVACO Alkalies, Chlorinated Chemicals and Carbon Bisulfide • NIAGARA Insecticides, Fungicides and Industrial Sulphur • OHIO-APEX Plasticizers and Chemicals • FAIRFIELD Pesticide Compounds and Organic Chemicals

## CHEMICAL MATERIALS

### Develop useful material for sweetening, fixing powder perfumes

**Uses:** As ingredient in many extracts, and particularly for sweetening, fixing powder perfumes.

**Features:** Ambreine is clearly soluble in benzyl alcohol, benzyl benzoate, and mixtures of essential oils and aromatics.

**Description:** Material is a fused blend of natural and synthetic fixatives and sweeteners.

(Ambreine solid is product of Dodge & Olcott, Inc., 180 Varick St., New York 14, N.Y.)

Check 4550 opposite last page.

### Organic chemicals list

Catalog of eight pages contains "modicum of dope" about manufacturer's chemicals: moisture conditioners, surfactants, polyester resins and molding compounds, and activated carbons. Cat CD 114—Chemical Div., Atlas Powder Company, Wilmington 99, Delaware.

Check 4551 opposite last page.



*"It doesn't seem to cure anything, chief, but think how it will look on television."*

Thanks to Tom Blakley, Florida East Coast Fertilizer Co., Homestead, Florida.

Check 4549 opposite last page



**IDEAS:** from other industries and nuclear field  
— new trends in research, processes, services

Here's a plant that's turning out commercial quantities of a material that has been a laboratory curiosity for over a century.  
A really unique operation, process produces . . .

## CHITOSAN — useful chemical from shrimp shells

TED F. MEINHOLD, Associate Editor  
With PAUL C. THOMAS, President  
Kylan Corporation

THE lowly shrimp shell, long considered a waste product and source of headaches for shrimp processors, has suddenly attained a status of importance in the chemical field. Thanks to the development of a new commercial process, large quantities of the shells are being used to produce an organic cellulose-like compound which is rapidly finding use in textiles, paper, cosmetics, pharmaceuticals, glues, and as a chemical intermediate.

A water insoluble, acid soluble, white flaked material, chitosan is a polymeric acetamino carbohydrate derivative occurring in its origin form, chitin, in shells of shrimp, crab, lobster, beetles, locusts, etc. Chitosan is produced from purified chitin by hydrolysis.

A laboratory curiosity for over 100 years, its uses were never fully developed because of limited availability and high cost. However, with the advent of modern, high-speed shrimp-shelling methods, large quantities of shells have become available, resulting in an ample supply of low-cost raw material for making chitosan.

A commercial process perfected by The Kylan Corporation, a subsidiary of Moretex Chemical Products, Inc., Spartanburg, S. C., is in operation at Brunswick, Georgia. Currently handling about 10,000 pounds of shells per day, the plant daily

turns out approximately 500 lb dry chitosan.

### Process Description

Process consists first of cleaning the shells to rid them of all protein and other extraneous matter. This is done by screening and washing them and then boiling in a 1-5% soda ash solution for about 5 hours in a 5000-gal steel tank.

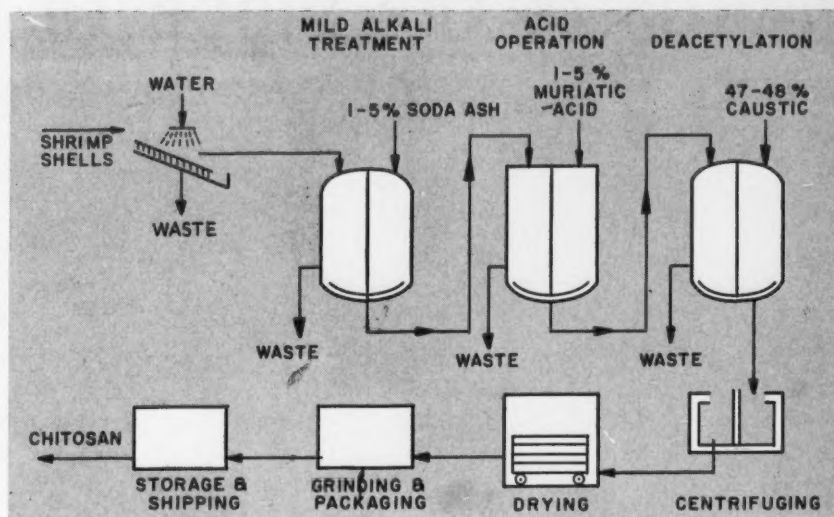
After boiling, shells are washed free from alkali and transferred to a 5000-gal wood tank. Here they are treated with a 1-5% muriatic solution for 12-14 hours in order to remove all lime and other calcareous matter. This is followed by a washing operation until shells are completely neutralized.

Resultant product is essentially pure chitin. In this state, however, it has only limited use so it must be further processed into a usable material.

Difference between the chitin molecule and cellulose is that the former has amine groups where the latter has hydroxyl groups. Attached to the amine groups are acetyl groups. In order to produce a material that is soluble in dilute acids, a portion of the acetyl groups must be removed.

This is done by treating the chitin with 47-48% caustic in a 5000-gal nickel-clad tank.

Processing is conducted with



Starting with about 10,000 lb of wet shrimp shells, process turns out approximately 500 lb dry chitosan per day



Immediately upon arrival at plant, shells are screened and washed

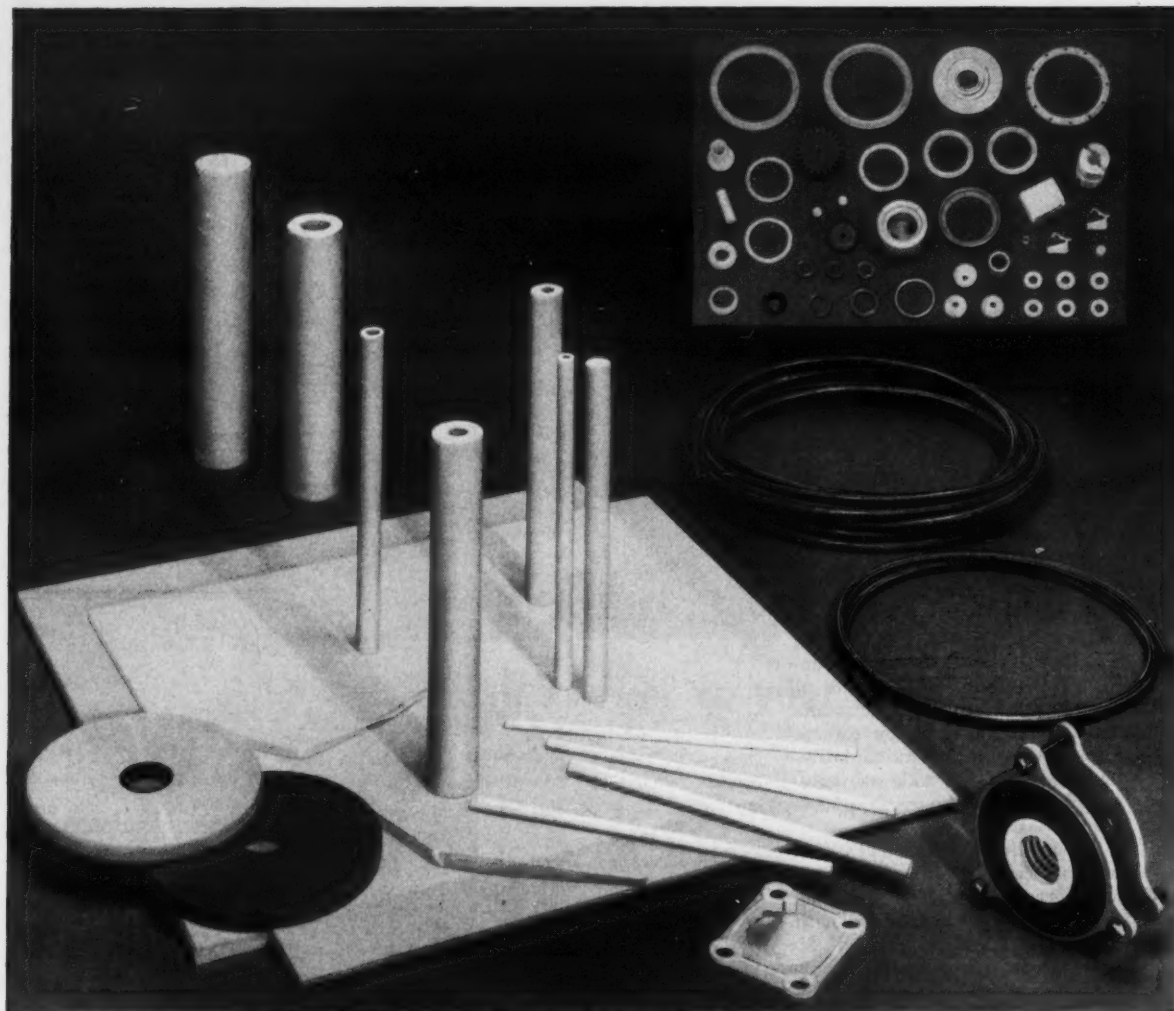
Photos by CP Staff

Deacetylation is carried on in 5000-gal nickel-clad tank





# If you need TEFLON\* in any form R/M is the place to get it!



Raybestos-Manhattan pioneered in research and development in the use of "Teflon." R/M has had vast experience in fabricating this amazing substance . . . has accomplished things with it once thought impossible, such as molding highly complex valve diaphragms.

But R/M has more than the know-how—it has the facilities to produce "Teflon" in exactly the form you want it . . . can supply *all* your needs, from the usual types of

tubes, tape, rods, sheets and flexible wire braid covered hose to complicated molded and machined parts.

That is why R/M should be your headquarters for all your needs in products made of "Teflon," from simple standardized parts to intricate components painstakingly customized to your specifications. Call on your nearest R/M district office for the cooperation you need. Or write for detailed information.

\*A Du Pont trademark



## RAYBESTOS-MANHATTAN, INC.

PLASTIC PRODUCTS DIVISION FACTORIES: MANHEIM, PA.; PARAMOUNT, CALIF.

Contact your nearest R/M district office listed below for more information or write to Plastic Products Division, Raybestos-Manhattan, Inc., Manheim, Pa.  
BIRMINGHAM 1 • CHICAGO 31 • CLEVELAND 16 • DALLAS 26 • DENVER 16 • DETROIT 2 • HOUSTON 1 • LOS ANGELES 58 • MINNEAPOLIS 16  
NEW ORLEANS 17 • PASSAIC • PHILADELPHIA 3 • PITTSBURGH 22 • SAN FRANCISCO 5 • SEATTLE 4 • PETERBOROUGH, ONTARIO, CANADA

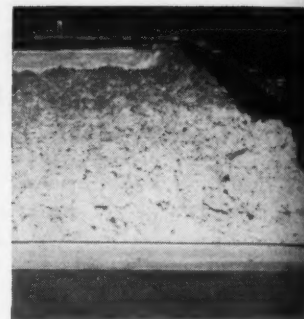
RAYBESTOS-MANHATTAN, INC., Engineered Plastics • Asbestos Textiles • Mechanical Packings • Industrial Rubber • Sintered Metal Products • Rubber Covered Equipment  
Abrasive and Diamond Wheels • Brake Linings • Brake Blocks • Clutch Facings • Laundry Pads and Covers • Industrial Adhesives • Bowling Balls

Check 4552 opposite last page

### IDEAS

the exclusion of air at temperatures near boiling for 2-4 hours. The operation is rigidly controlled to assure little or no breaking down of the cross-linkage in the molecule or removal of the amine groups.

After deacetylation, product is washed until neutral, dried, and then ground to desired



Dried product has no melting point, contains about 6-8% moisture

particle size. Final material has moisture content of 6-8%. Overall yield for process is about 5%.

The deacetylated chitin, called "Kylan", is essentially a high polymeric free primary amine, which forms salts with certain acids. The material is easily soluble in dilute aqueous organic acids such as acetic, glycolic, maleic, formic, adipic, citric, etc.

The dry product does not have a melting point. It will gradually develop cross linkages to form a material with a high viscosity if it is stored over 100°F for any extended period of time. Long exposure to air will cause decomposition and yellowing resulting in lower viscosities of its solution.

(Further information about Kylan can be obtained from Kylan Corporation, subsidiary of Moretex Chemical Products, Inc., 314 W. Henry Street, PO Box 2528, Spartanburg, S. C.)

Check 4553 opposite last page.

For more information on product at right, specify 4554 . . . see information request blank opposite last page.





Photo courtesy of Economics Laboratories, Inc.

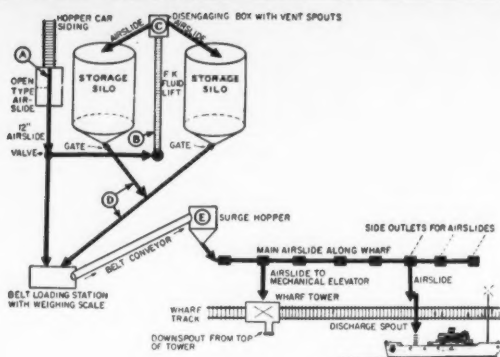
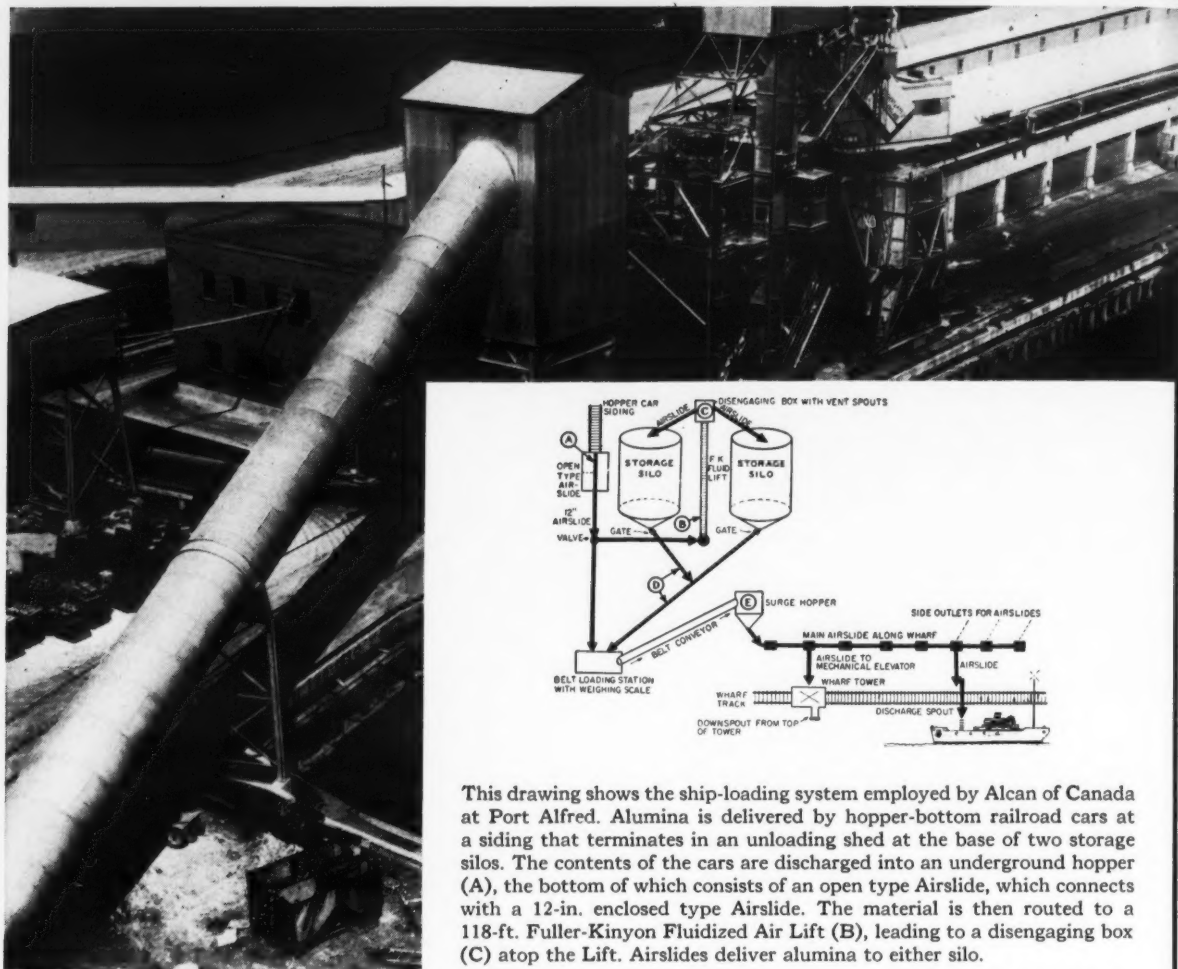
## *After you buy a Clark truck . . . what then?*

Almost more important than your original truck purchase is the service you get *after* delivery. Quality of the truck is taken for granted. What you're interested in is *keeping* the equipment on the job and keeping maintenance costs down. It's why competent local service is so important.

If you are already a Clark user, you know the service your local Clark dealer supplies is fast, dependable and economical. You know, too, that

his service extends to such things as improving equipment utilization, safety programs for your employees, and a number of other services designed for your specific benefit. If you would like *full* details on the many special aids available, write to: Local Service, Clark Equipment Co., Battle Creek, Michigan.

**CLARK<sup>®</sup>**  
**EQUIPMENT**



This drawing shows the ship-loading system employed by Alcan of Canada at Port Alfred. Alumina is delivered by hopper-bottom railroad cars at a siding that terminates in an unloading shed at the base of two storage silos. The contents of the cars are discharged into an underground hopper (A), the bottom of which consists of an open type Airslide, which connects with a 12-in. enclosed type Airslide. The material is then routed to a 118-ft. Fuller-Kinyon Fluidized Air Lift (B), leading to a disengaging box (C) atop the Lift. Airslides deliver alumina to either silo.

When a ship is readied for loading, alumina is drawn from the silos by open type Airslides and transported by means of 16-inch Airslides (D) to a belt, which delivers to a surge hopper (E) feeding the 400-ft. long Airslide for conveying to the ship. Air for the operation of the Fuller-Kinyon Fluid Lift is supplied by a Fuller Rotary Compressor.

## Here's how ALCAN reduces ship loading time 50%

### ... FULLER SYSTEM PAID FOR ITSELF IN WEEKS

Expansion of The Aluminum Company of Canada's pneumatic conveying system at Port Alfred, Quebec, has cut ship loading time of alumina by 50 percent.

Engineered and built by Fuller, this pneumatic conveying system has eliminated frequent interruptions in the loading schedule and made possible big savings in handling cost. The initial cost of the installation was absorbed within the first few weeks of operation!

Additional equipment consists of two 35-ft. portable F-H Airslides® operating in tandem off of a main 19-in. Airslide running a distance of 400 feet along the roof of the wharf.

These Airslides discharge the alumina directly into the hold of the ship, eliminating the time-consuming shutdown during relocation of the bucket elevator and tower for delivery to various holds.

This carefully planned system points out how Fuller's more than 30 years of specialized experience in engineering and manufacturing pneumatic materials-handling equipment helped another company save time and money. We would like to put our facilities to work for you, too. Write, giving us details of your operations.



**FULLER COMPANY**  
136 Bridge St., Catasauqua, Pa.  
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION  
Birmingham • Chicago • Kansas City • Los Angeles • San Francisco • Seattle

G-167  
4365



### German 1958 chem show to be 40% larger than 1955

Representing firms showing products will total 950

The Achema 1958, 12th Chemical Engineering Exhibition and Congress, will take place within the framework of the European Congress of Chemical Engineering 1958 in Frankfurt (Main) from May 31 to June 8, 1958. Organized and managed by Dechema (Deutsche Gesellschaft für chemisches Apparatewesen), the exhibition will be housed in 14 halls with floor space of 700,000 sq ft, plus 50,600 sq ft of grounds. It will be about 40% larger than the previous exhibition in 1955 which occupied a floor space of about 538,000 sq ft.

More than 6000 manufacturers, engineers, physicists, and chemists are expected to attend. Representatives of 950 firms and 15 European and non-European countries will demonstrate and display their products.

The main fields of chemical engineering, science, and technology will be covered by a total of 97 papers. Visits to chemical industries in the Frankfurt district are also arranged.

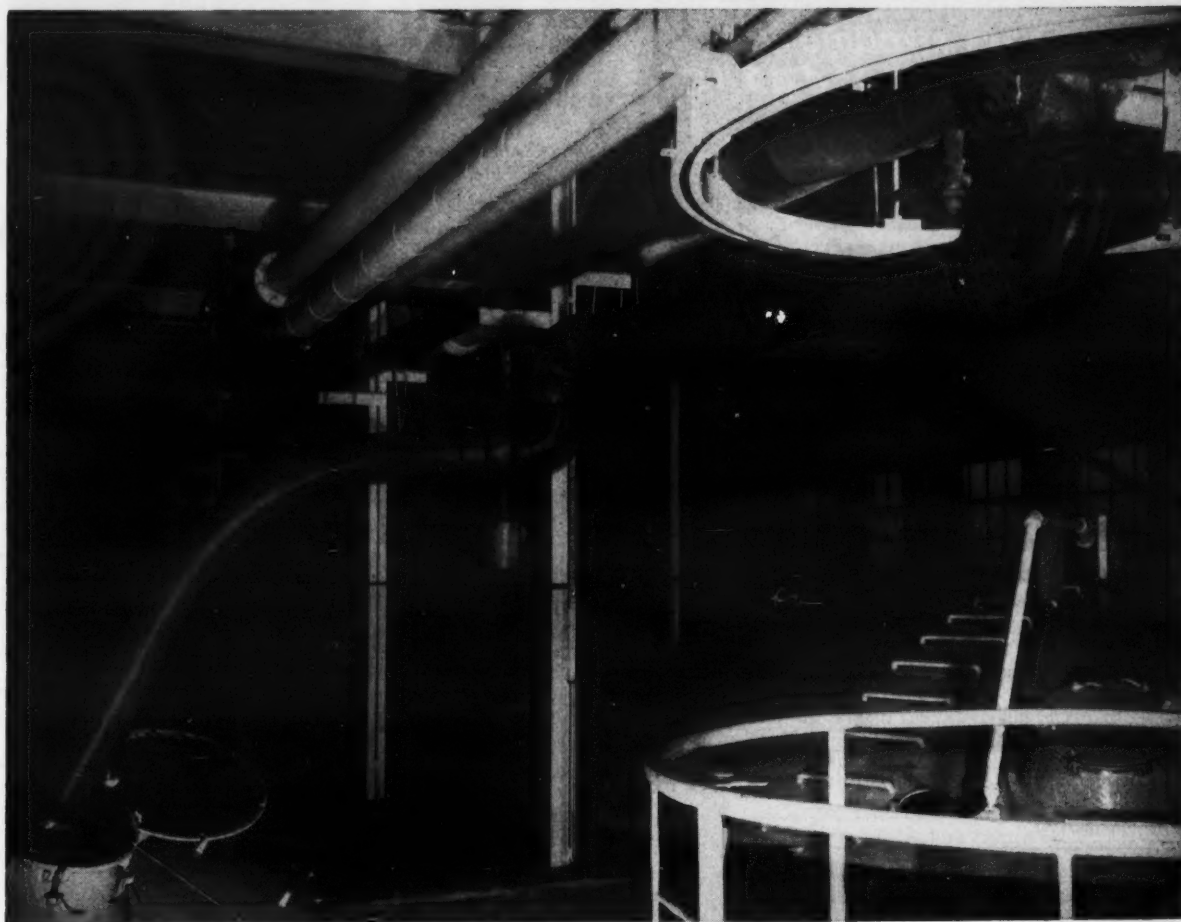
(The program of the Achema Congress 1958 and of the European Congress of Chemical Engineering 1958 may be obtained from the Dechema, Frankfurt (Main) 7, Postfach.)

Check 4556 opposite last page

### Chemical milling data

Up-to-date discussion on chemical milling is contained in ten-page brochure which describes chemical milling advantages, applications, operation, and other pertinent data. Chemical milling brochure — Contract Engineering Dept., United States Chemical Milling Corporation, 1700 Rosecrans Ave., Manhattan Beach, California.

Check 4557 opposite last page.



## NO MAINTENANCE IN 11 YEARS!

That's the performance record of the Chiksan swivel joints at the Peoria, Illinois plant of the Hiram Walker Company. Day in and day out for eleven years, Chiksan swivel joints have given the necessary flexibility of flow lines, and safety of operation in the transfer of mash to the fermenters without line rupture or loss of product. The packing on these swivel joints *has never been changed* even though low pressure steam is continually run through the assemblies when they are not in operation. Assure yourself of minimum maintenance with long trouble free operation by specifying versatile Chiksan swivel joints.



Chiksan swivel joints turn with full 360° rotation in 1, 2 and 3 planes, handling, air, hydraulics, fuels, oils, water and other fluids.

# CHIKSAN

WRITE FOR CHIKSAN CATALOG G-4

Subsidiary of Food Machinery and Chemical Corporation



Please address Dept. 174



**CHIKSAN COMPANY**, Brea, California • Chicago 3, Illinois • Newark 2, New Jersey • Well Equipment Mfg. Corp., (Division) Houston 7, Texas • Chiksan Export Co., Brea, California; Newark 2, New Jersey • Chiksan of Canada, Ltd., Edmonton, Alta.

Check 4558 opposite last page

STRAIGHT LINE CONTROL  
**BLUE M'S REVOLUTIONARY  
 POWER-O-MATIC**  
 INDUSTRIAL Patents Pending  
**BATCH OVENS**

**OUTPERFORMS ALL OVENS**

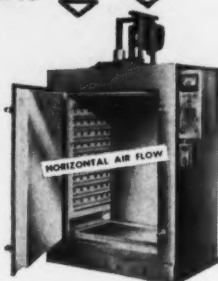
GUARANTEED

- 23.8% COST SAVINGS
- AUTOMATIC HEAT RECOVERY
- MULTIPLE FAIL-SAFE FEATURE

**IMPROVED PRODUCTS  
 SUPERB PERFORMANCE**

POWER-O-MATIC automatically proportions minimum wattage in relation to temperature and work load. Fully automatic. Operator merely sets temperature. Finest advancement of temperature control in 50 years.

**COMPETITIVELY PRICED!**



Models from  
 16 to 96 cu. ft.



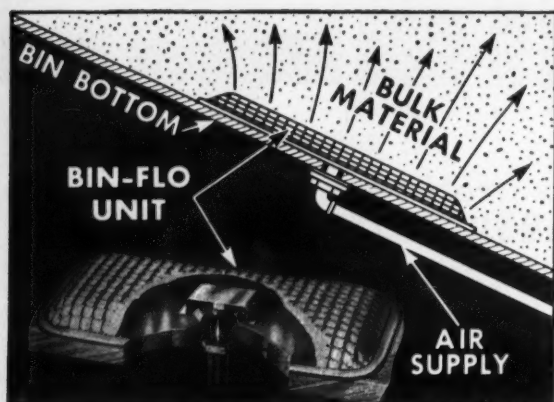
TEMP. RANGE 100°F. TO 600° F.

Write for "The POWER-O-MATIC Story"

**BLUE M ELECTRIC CO.** BLUE ISLAND, ILL.

MANUFACTURERS AND DESIGNERS OF COMPLETE  
 TEMPERATURE CONTROLLED EQUIPMENT

Check 4559 opposite last page



**BIN-FLO** USES SMALL VOLUME  
 OF AIR AT LOW  
 PRESSURE  
**KEEPS BULK MATERIALS MOVING**

**BIN-FLO** units in bins, chutes, hoppers, etc., restore flow characteristics to dry, finely ground materials which tend to pack or bridge in storage. Types for all materials and conditions. No moving parts; simple installation; negligible operating cost; no maintenance cost.

**BIN-DICATOR** the original diaphragm-type bin level indicator. In successful use for over 20 years. **ROTO-BIN-DICATOR** new, motor-driven paddle type; excellent on bins under pressure or vacuum, and for general application. Also explosion-proof units, U.L. listed.

**THE BIN-DICATOR CO.**

13946-D Kercheval • Detroit 15, Mich.

Write for detailed literature  
 or call  
 Valley 2-6952

**WE SELL DIRECT • PHONE ORDERS COLLECT**

Check 4560 opposite last page

**IDEAS**

**Mathematical formulas  
 throw additional light  
 on science unknowns**

May soon predict feasibility  
 of a chemical process

Scientists have developed a complicated mathematical process which may accelerate and complete facts of knowledge in the fields of chemistry, physics, and chemical engineering. Two years were spent developing the formulas which give values to constants that repeat themselves within several large molecules.

The new method supplies numerical values for each constant, making it possible for many molecules to be analyzed, and speeding up the analyzing process. Vibrational frequencies of a molecule lead to data regarding the molecule's thermodynamic properties.

Knowledge of these properties is of great value to chemical and petroleum industries because they can be used to predict the practicality of a chemical process.

Validity of the new formulas has been tested by calculating other molecular constants which are observed with great accuracy by means of ultra-short radio waves.

(Work was conducted at Illinois Institute of Technology, 35 West 33rd St., Technology Center, Chicago 16, Ill.)

**AMA speaking course  
 helps executives  
 develop skill**

Covers major problems of  
 effective speaking

A two-week program in effective speaking for managers, designed to help executives develop skill in addressing management and employee groups, and in directing people in a face-to-face situation, opened March 17 at the AMA Academy, Saranac Lake, New York.

Chief emphasis in the course was on individual practice and drill sessions. Participants

# PROCESS EQUIPMENT

## Built To Your Specifications

When you require custom-built processing equipment, write The Squier Corporation, Buffalo, New York. With over 100 years experience in fabricating processing equipment, we are equipped to build to your specifications with the highest degree of accuracy.

Your requests will be handled promptly, in strict confidence. Our estimate of the costs involved will be sent to you in the shortest possible time.

Remember, when you want a new piece of processing equipment built to your specifications, write or phone The Squier Corporation for fast service, reliable workmanship.

**The SQUIER Corp.**

**Engineers & Manufacturers**

**524 Broadway Buffalo, N.Y.**

Check 4561 opposite last page



**Longer Wear  
 in every pair  
 and SAFER, too!**

**SEIBERLING**

**FIRM  
 GRIP**

**INDUSTRIAL GLOVES**

- Patented embossed NON-SLIP safety grip moulded into fingers and palm.
- Curved fingers for more comfort and better fit.
- Tough and durable... last longer, look better.

Natural Rubber or Neoprene Latex

SEND FOR  
**CATALOG No. G 3**  
 of Seiberling's complete  
 Industrial Glove Line!

**Seiberling**  
**LATEX PRODUCTS**  
 New Bremen, Ohio

Check 4562 opposite last page

CHEMICAL PROCESSING

form small work groups for intensive training on individual speech projects. Training includes use of specific speech techniques, methods of preparation and organization, and ways of evaluating the effectiveness of material and audience response.

Special presentations are made by operating executives from industry who have achieved success in public speaking.

Members are encouraged to work on presentations they plan to make in their own companies, using AMA facilities and staff aid in preparing them. Each participant has a sound motion picture made of one of his presentations.

One course per month is scheduled until June. Dates are April 14-25; May 12-23; and June 2-13. Registration fee for the two-week course is \$400 for AMA members, \$475 for non-members, and \$20 a day for living expenses at the Academy.

(Further information about speaking course may be obtained from American Management Association, 1515 Broadway, Times Square, New York 36, N. Y.)

Check 4563 opposite last page.

#### **Probe electronic structure of atoms, molecules, and crystals**

Low-energy accelerator developed for task

To facilitate studies of low-energy particles, Stanford Research Institute, under the sponsorship of the US Army Engineer Research and Development Laboratory, Fort Belvoir, Virginia, has developed a low-energy electron accelerator. Unit is capable of producing a defined electron beam adjustable to energies from a fraction of an electron volt to several hundred electron volts.

In a recent study, a small crystal of alpha lead-azide was placed in the accelerator and bombarded by the electron beam. Interactions between the electron beam and

## **New light on how nickel reduces corrosive attack by fast-moving chlorinated solvents**



Most chemical processors know that dilute HCl formed by decomposition of chlorinated solvent-water mixtures corrodes steel much more readily than Nickel.

*But it's not so widely known that in Nickel equipment there is less hydrolysis of solvent . . . less formation of HCl to cause damage.*

**National Aniline puts this Nickel extra to good use in making diisocyanate**

From the time diisocyanate is formed in a Nickel-clad reactor at National Aniline's Moundsville, W. Va. plant, the product touches no metal other than Nickel. Tanks are Nickel. Miles of tubing. Pumps. Cast fittings.

Here in the photograph is just one example. It's a sight-flow indicator with cast Nickel body. Based on corrosion to date, this cast Nickel body is expected to last ten years or more despite location of the indicator in a return line carrying fast-moving chlorinated solvent, phosgene, and the troublesome dilute HCl.

**Jacoby-Tarbox Corp. had Inco cast the body parts for this sight-flow indicator**

In producing sight-flow indicators, pressure tightness and strength are all important. Gasketing, glass seal, and castings must meet high specifications and close tolerances.

Consequently, Jacoby-Tarbox has Inco cast the body of indicators that will be used in lines carrying corrosives. Inco is a primary source for Nickel and its alloys and the Inco foundry has long experience in casting these materials.

**What can you expect from cast Nickel?**

An Inco pamphlet, "Engineering Properties of Cast Nickel" answers this question in detail . . . covering compositions, physical constants, hot hardness, mechanical properties, much more. Send for your copy.

**THE INTERNATIONAL NICKEL COMPANY, INC.**

67 Wall Street



New York 5, N. Y.

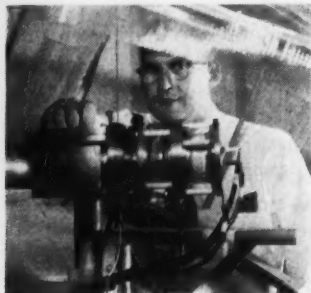
## **INCO-CAST PRODUCTS**

Check 4564 opposite last page



the surface of the crystal were recorded as an electrical current.

When sufficient data have been collected, they will be compared with similar data for the interactions of photons, or light, through the crystal. The comparison will indicate



Low-energy electron accelerator is capable of producing a defined electron beam adjustable to energies from fraction of electron volt to several hundred electron volts. Screen prevents interference from external electrical signals

whether the slow electrons "see" the crystal structure or the individual molecules of the crystal.

Preliminary experiments indicate that the apparatus will provide a powerful tool for investigating the microscopic processes involved for dissociation, electron emission, and photolysis of solids as well as for investigating crystal structure.

(Low-energy electron accelerator was developed by Stanford Research Institute, Menlo Park, California.)

**Chemical salts compacted more economically with new method**

Materials upgraded to more marketable product

A new continuous compacting progress was recently announced for upgrading of fine-mesh materials to a more marketable product. Essentially, the system consists of compacting fine particles between two rolls under extremely high mechanical pressures to produce a continuous

# Farris

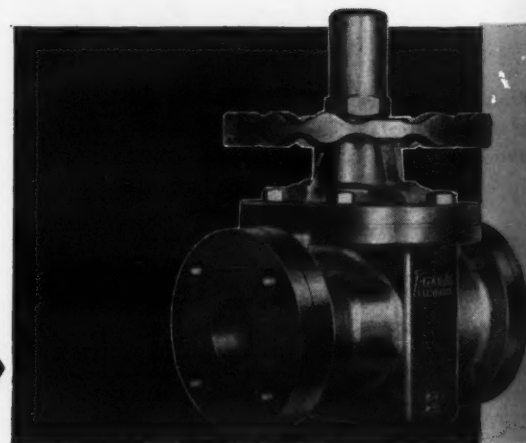


## *If it goes through a pipe - it will go through a Flex Valve*

The perfect valve for industry's toughest service! The Farris SUPERSEAL combines all the outstanding advantages of the standard 26-year job-proven flexible valve plus the added safety and performance of a complete metal enclosure...sealing in all movable parts and the flexible body itself. SUPERSEAL valves are ideal for full-pipe-capacity service under higher pressures, carrying a variety of materials from corrosive acids and chemicals to wet cement and wood chips!

**SUPER SAFETY!** Pressure tight housing fully encloses the flexible body, preventing escape of corrosive or toxic fluids when excessive wear takes place on the flexible body; patented flare-type dual seal insures complete protection for all working parts; cast housings available in alloys to meet your needs...**SUPER ECONOMY!** Self-supporting for money-saving installation and maintenance; inner valve bodies outwear metal 11 to 1; low cost valve bodies easily replaceable...**SUPER SERVICE!** Minimum hand-wheel effort; novel, self-aligning chain drive; minimum face-to-face dimensions; wide choice of accessories; choice of models for all requirements.

**Series 5200**  
Manually Operated SuperSeal  
operates with minimum effort



## FLEXIBLE VALVE CORP.

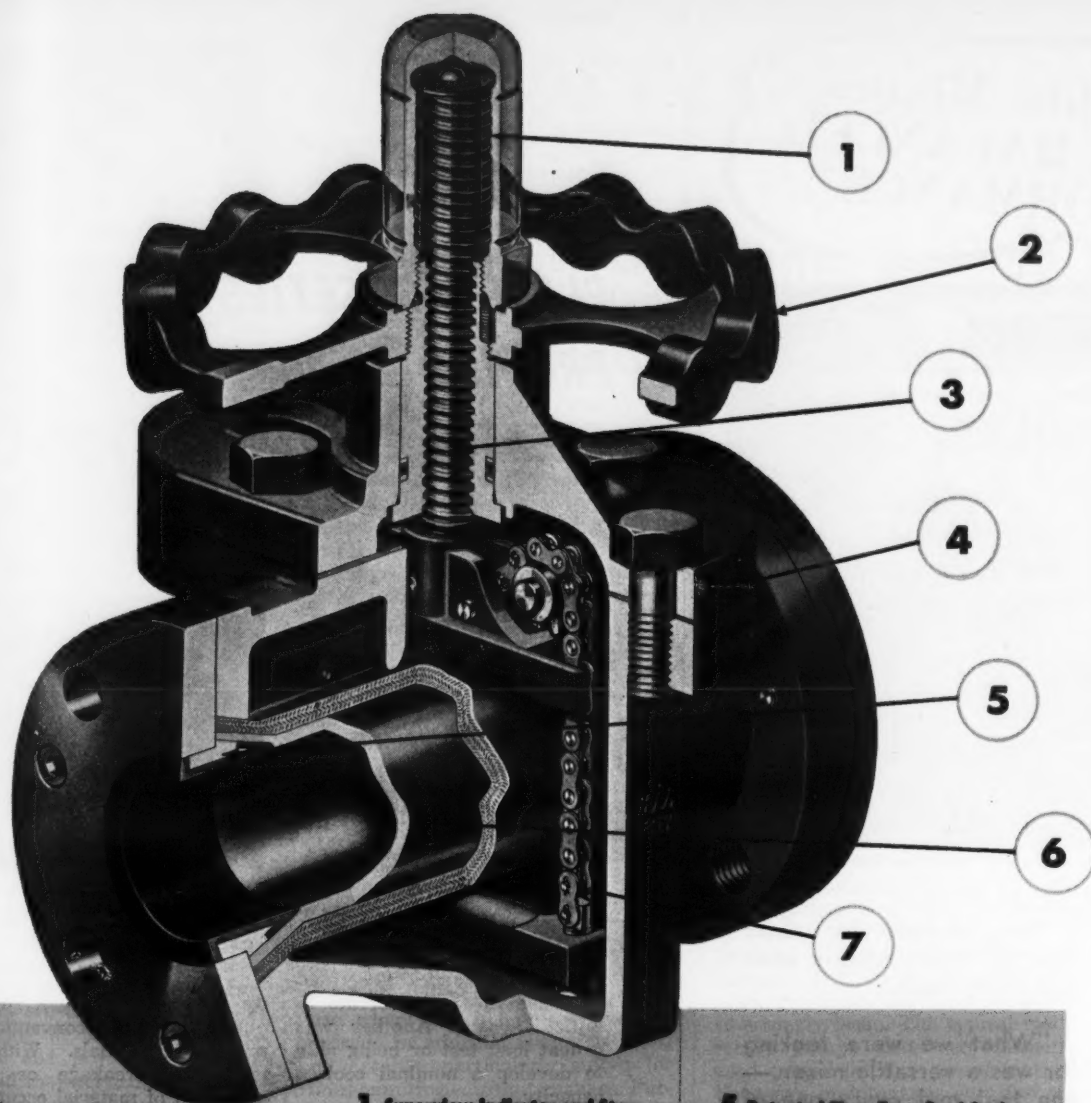
505 Commercial Avenue, Palisades Park, N. J. In Texas: 5405 Clinton Drive, Houston 20

Main Office  
Palisades Park, N. J.  
Windsor 4-6300

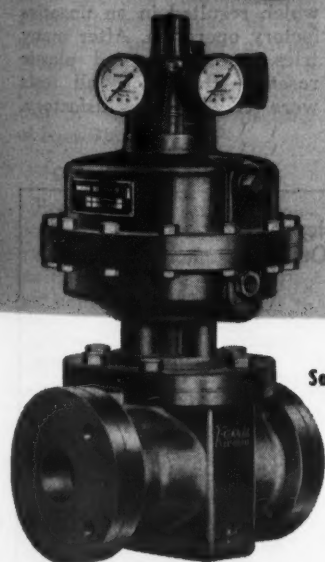
Texas Plant  
Orchard 2-7557

**affiliates:**

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FARRIS PICKERING GOVERNOR CO., INC.  
FARRIS HYDROTORQUE CORPORATION  
FARRIS HYDROSEAL CORPORATION



- 1 Supervisory Indicator and Stop
- 2 Non-Rising Hand Wheel—Minimum Effort
- 3 Durable Acme Thread—Stainless Steel
- 4 Completely Enclosed Metal Housing—Self Supporting
- 5 Patented Flare Type Dual Seal
- 6 Longer Life—Low Cost Body of Standard Fabric or High Strength Nylon
- 7 Self-Aligning Chain Drive



**Series 5300 and 5400**

Diaphragm Motor-Operated Superseal with valve positioner for automatic remote operation.

FARRIS FLEXIBLE VALVE CORP.  
808 Commercial Avenue, Passaic Park, N. J.

Gentlemen: Tell me more about the Farris SUPERSEAL Flex Valve.

☐ Mail Catalog Information. ☐ Have your representative call on me.

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COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

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sheet of material.

The sheet is shattered with a flake breaker into thin pieces about  $\frac{3}{4}$ " square. The pieces are granulated between two corrugated rolls operated at differential speeds, and the product is screened for desired size.

The fertilizer salt industry made the first successful application of the process. One compacting mill, two granulators, and one screen can refine approximately 10 tons of potash per hour 100% minus 28 mesh Tyler to a desirable 6 by 28 mesh Tyler with 60 to 70% granulation recovery from the closed circuit.

The compacting equipment is expected to find wide application. Three potash refineries are currently in production with the new process, along with two ammonium sulphate, one diammonium phosphate, and a sodium nitrite producer.

Tests indicate that process can be applied to inorganic salts as well as other materials where particle size, density, and solubility rate need close control.

(Continuous compacting process was developed by Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis.)

Check 4566 opposite last page.



"On the other hand, if we repair the leak we might have to install a drinking fountain."

Submitted by Joe Dilts, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware.

Check 4565 opposite last page

## Finds "Our Paul O. Abbé Mixers GIVE WELL BALANCED PERFORMANCE"

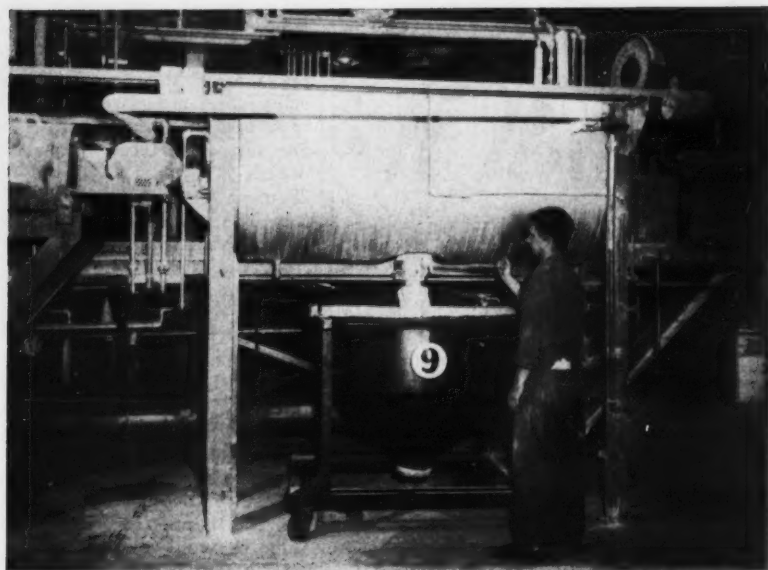


Photo courtesy Hercules Powder Company

A WELL-KNOWN MANUFACTURER HAD TO MIX CELLULOSE ACETATE WITH VARIOUS COLORS.

### They wanted:

1. To get an homogeneous mix.
2. To eliminate any possibility of contamination or discoloration from one batch to the next.
3. To obtain maximum size of the batch.
4. To be able to mix a wide range of formulations without lumping.

They stated that their Paul O. Abbé Mixers have met every need.

"What we were looking for was a versatile mixer — one that met every one of our requirements to a high degree," they state.

"Our Paul O. Abbé Mixers we find give well-balanced service. They are versatile. They rank high in meeting our requirements."

You, too, may find Paul O. Abbé Mixers help you solve YOUR mixing problems.

Write today for Catalog "V-1," describing our line of dry and paste mixers.

**PAUL O. ABBÉ**

402 Center Avenue

Little Falls, New Jersey

Check 4567 opposite last page

## IDEAS

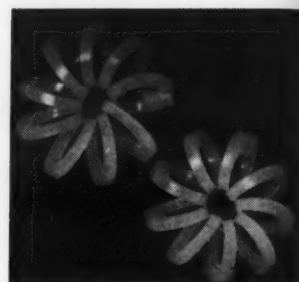
Army's mobile cooling tower proves-out use of polyethylene tower packing

## PLASTIC ROSETTES PROVIDE 20-40% GREATER COOLING EFFICIENCY

Although precise details of use are confidential, recent missile firings have suggested a reason for interest of Corps of Engineers in polyethylene tower packing. News dispatches have mentioned a mobile trailer-mounted cooling tower for use with the Corps of Engineers' mobile carbon dioxide generating plant.

As a mobile cooling tower unit, trailer was required by Army specifications to meet certain difficult "use" specifications. One included ability to withstand shock generated over 50 miles of moderate to difficult roads. Another was a heat load test or being able to develop a nominal cooling capacity.

Beginning in 1955, Army Corps of Engineers began testing a number of packing materials. Although apparently a simple test, the roadabil-



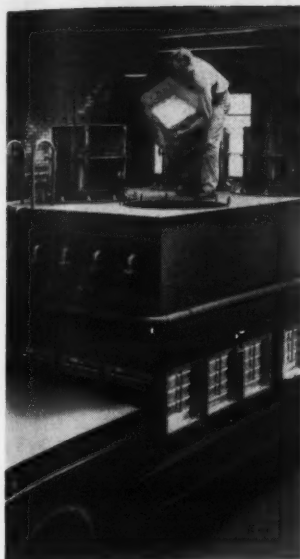
Close-up of rosettes. Pressure drop is only about 35% of equivalent size packing

ity qualification began ruling out all more conventional packing materials. Without exception, breakage or degradation of material occurred which resulted in an unsatisfactory operation. After many tries, engineers tried plastic rosettes. Results of all tests were completely satisfactory.

### Comparison of Physical Characteristics of Plastic Rosettes with Other Ceramic Packings

	Tellerettes ¾ x 2" polyethylene (1" normal size)	Raschig Rings 1" Ceramic	Berl Saddles 1" Ceramic
Free Vol, %	83	66	69
Surface, sq ft/cu ft	76	58	76
Interstitial holdup points/cu ft	37,000	10,800	17,500
Wt, lb/cu ft	10	48	45
No. units/cu ft	1125	1330	2200





Light in weight, plastic rosettes are loaded into mobile cooling tower. Since 60% of normal tower installation costs are for shell, supports, and internals other than packing, light weight illustrates possible savings in construction costs

Made of light-weight, corrosion-resistant polyethylene in a non-compressible toroidal helical shape, rosettes are unaffected by highly corrosive chemicals, hydrofluoric acid, and strong caustics. Rosettes are designed for use as packing in diffusional operations and provide holdup of liquid in interstitial spaces to alter mass flow characteristics. Principal advantages of rosettes are that they provide 20-40% greater efficiency at a pressure drop of only 35% that of conventional packing of equivalent size.

#### Cooling Tower on Trailer

Ready at a moment's notice, the cooling tower on a trailer has nominal design capacity of three million Btu per hour. Unit is designed to reduce temperature of 240 gpm of water from 115°F to 90°F dry bulb and 80°F wet bulb air. Four totally enclosed fans, for Class 1 operation, operating on 220-volt 3-phase AC, provide air circulation. Air movement is upward through bed, passing into tower by means of louvers at sides of tower. Cooling water is circulated by centrifugal

# VANTON *notes on fluid handling*

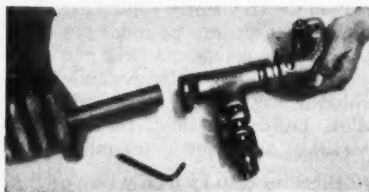
PUMPS • PIPE • FITTINGS • VALVES

## NEW QUICK COUPLING STAINLESS FITTINGS CUT TIME AND COSTS

Shulton, Inc., Clifton, N. J. manufacturers of the Old Spice line of men's grooming aids, recently faced the problem of setting up a 1300 ft line of 1" stainless steel tubing over a two-day week-end. They did it by using Quikupl, the new patented stainless fittings requiring no threading, welding, flaring, or heavy-wall pipe.

Since the lines to be put up were practically all overhead and had many take-off points to valves, tanks, and pumps, Shulton realized that standard threaded or welded fittings would take too much time, and disrupt production. With Quikupl couplings, elbows, and adapters two men set up the entire line in less than one day. The only tools required were a pipe cutter and an Allen wrench. This effected considerable savings in labor and substantial material economies by enabling the use of thin-walled tubing.

Quikupl fittings are a natural to use where rapid installation is required. In addition they are 100% salvageable, particularly suited for lines requiring constant changes. Furnished in sizes from 1"-4", Quikupls are available in types 304 and 316 with a variety of seal rings to handle a wide range of corrosives. Write for BULLETIN 312.



#### New Literature:

Plastic "Flex-Plug" Gate Valve. Four-page folder includes detailed description and operational features of unique plastic gate valve. Technical data and dimensions are included. BULLETIN 313.

#### Technical Literature:

Folder offers nine items of technical literature on corrosion-resistant pumps, pipes, valves, and fittings. BULLETIN 314.

## Pump leakage and metal contamination eliminated by plastic sealless pump construction

### Pump problems on corrosive slurry removed by unique Vanton design

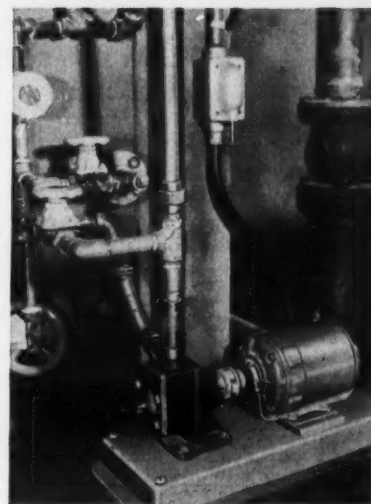
Product contamination, abrasion, and leakage problems at the Reheis Company's pharmaceutical chemicals plant in Berkeley Heights, N. J., were solved recently by installation of Vanton plastic sealless pumps. At Reheis, production of high-purity aluminum hydroxide gels, chlorhydroxide, and related fine chemicals demands the highest quality standards.

In one phase of the operation, pump problems threatened this quality requirement. Here Chlorhydrol and Chloracel fluids, running to 5% abrasive slurries, are recirculated through pH electrode assemblies. pH readings range from strongly acidic to strongly basic. The typical metal rotary pumps that were formerly used caused product contamination. Excessive maintenance was also encountered due to general corrosion and shaft scoring by the abrasive fluid, leading to costly seal leakage.

These problems were solved when Reheis purchased Vanton Buna N Plastic sealless pumps. Contamination was eliminated because no fluid touches metal parts, and leakage and abrasion problems were avoided by the pump's design with no stuffing boxes or shaft seals. Further, abrasion problems were avoided because the flexible liner absorbs the abrasive action of the slurry.

### How Vanton Pump Works:

With stuffing boxes and shaft seals eliminated by the unique design, leakage is no longer a problem. Metallic contamination is impossible,



Vanton plastic pump handles corrosive abrasive slurry at Reheis Co., Berkeley Heights, N. J.

since the fluid cavity of the pump is formed by the inside of the channeled plastic housing and the outside of the synthetic liner. Flanges on the liner, clamped to the sides of the housing



by end plates, isolate all fluid to this cavity. Pumping is accomplished by a rotor mounted on an eccentric shaft, which rotates within the liner, creating a progressive squeegee action on the fluid trapped between the liner and the housing.

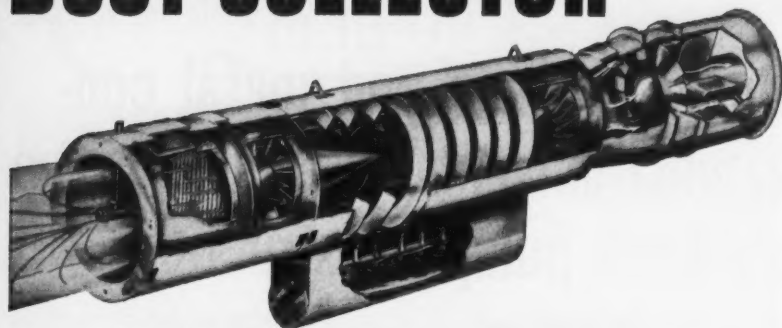
Capacities of the Vanton sealless plastic pump range from 1/2 to 40 gpm. Liners and housings are made in a variety of plastic materials, to suit a wide range of corrosive, acid, and slurry conditions. For further details, write for CATALOG 311.



**VANTON PUMP**  
and Equipment Corp. • Hillside, N. J.  
DIVISION OF COOPER ALLOY CORP.

Check 4568 opposite last page

# PROVED NEW JOY-MICRODYNE DUST COLLECTOR

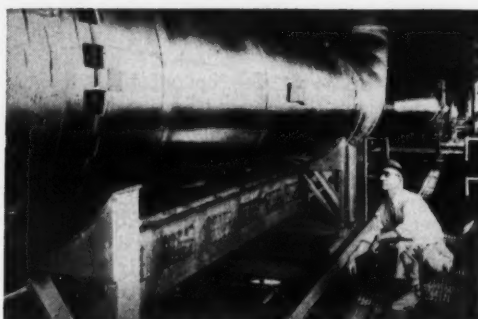
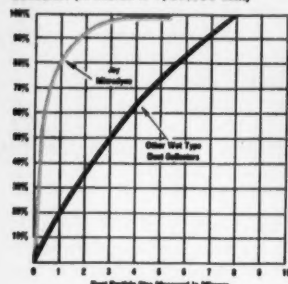


## PROFILE OF A PROBLEM SOLVER

Here is an in-duct "educated pipe" that laughs at space, weight and water limitations as it collects over 99% of dust 5 microns and larger; 92% of 2-micron dust, and substantial amounts of smaller dust.

Particles enter through water-saturated air, slam against a water-film-covered impingement element, encase themselves in water droplets as they pass through, then whirl and collect on the sides of the middle section, to finally drain into a sump. Cleaned air is straightened and thrust on its way by an integral Joy Axivane Fan.

Performance graph of actual installation shows efficiency of the Joy Microdyne Dust Collector. (A micron is 1/25,000 inch)



This 48,000 cfm installation shows space economy of in-duct placement.

**SAVES SPACE**—Installs as an integral section of duct-work; requires only 1/10 to 1/20 the space of conventional units. 2500 cfm unit is 10 feet long; just 15 inches in diameter.

**SAVES WEIGHT**—Even the largest unit 64,000 cfm, 5 feet in diameter, 32 feet long—weighs only 6,500 pounds . . . or 1/5 the weight of conventional collectors. 2,500 cfm unit weighs only 325 pounds.

**SAVES WATER**—The largest Joy collector requires only 48 GPM flow—much less than comparable wet collectors. Add a Delpark Filter (Sold by Joy) and water

can be recirculated to recover valuable dusts. The filter also reduces water borne solids to give a dependable, clear water supply from a dirty water source.

### SUCCESSFUL INSTALLATIONS—

Joy collectors from 500 cfm through 64,000 cfm are now in use collecting such widely varied dusts as hematite, copper and uranium ores, coal, quartz, limestone, phosphate, stainless steel and titanium carbide grindings. For answer to your dust collecting problems, write, wire or call: Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

WRITE FOR FREE BULLETIN 227-80

**JOY** . . . EQUIPMENT FOR INDUSTRIAL PLANTS . . . FOR ALL INDUSTRY



Conveyors



Industrial Compressors



Electrical Connectors



Fans and Blowers

WOW 1-6983-227

Check 4569 opposite last page

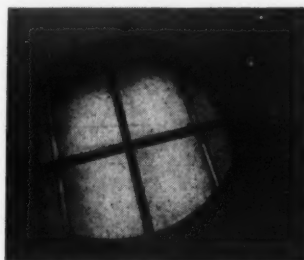
## IDEAS

pump counter-currently to air flow through spray heads over packed section. After passing through packing, water is recovered in sump below louvres.

Because water is recirculated, facilities for water treatment are not extensive. Small water treatment tank at trailer head is adequate. Construction of tower is of low-carbon steel. Louvres are aluminum, designed for individual manual adjustment.

Spray heads for recirculated water are only inches above bed of rosettes supported by a grid. Above spray heads is a wire-mesh type entrainment separator. Circulating fans are mounted directly over the entrainment separators and bolted to the top deck.

Simple comparison of phys-



Bed of plastic rosettes in mobile cooling tower. Circulating fan mounts over opening

ical characteristics of plastic rosettes with ceramic packing of equivalent size indicate one strong initial advantage to Army engineers—weight per cubic foot occupied.

Polyethylene packing weighs only ten pounds per cubic foot compared with 48 and 45 for one inch ceramic Raschig rings and Berl saddles. Other physical characteristics are shown in table.

(Tellerette Polyethylene Tower Packing is product of the Harshaw Chemical Co., 1945 E. 97th Street, Cleveland 6, Ohio.)

Check 4570 opposite last page.

(Mobile Cooling Tower was designed and fabricated by Badger Manufacturing Company, 230 Bent St., Cambridge, Mass.)

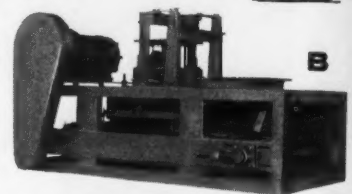
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## UNITIZED WEIGHER-FEEDER

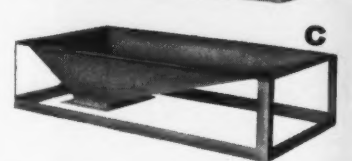
Building-block design gives custom-made utility at an off-the-shelf cost



A



B



C

UNITIZED construction makes the W-C Weigher-Feeder readily adaptable to practically any processing setup. Components are standardized, proven and interchangeable . . . pre-engineered with virtual "plug-in" simplicity.

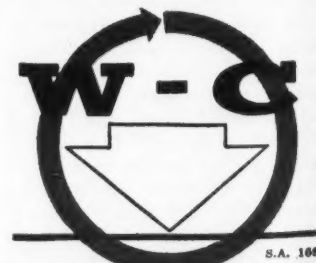
**A** The UPPER FRAME controls material input, is supplied with a rotary feeder, sliding gate, vibratory feeder or other mechanism matched to material and flow requirements.

**B** The CONVEYOR FRAME, where material is weighed, includes a complete conveyor section, weighing pan and transmitter with integral tare adjustment. W-C's system of flexure mountings assures accurate measurement despite uneven loading or pile-ups. There are no knife-edges, beam pivots or other points of concentrated wear to affect accuracy.

**C** The LOWER FRAME is optional; can be a simple chute as shown.

In addition, the W-C Weigher-Feeder is designed to handle such instrument-controlled functions as flow totalizing, recording, programming, and material proportioning. Units are also available for installation on existing conveyors.

Complete information is given in Catalog 12. Write for a copy



S.A. 1067

**WEIGHING and Control COMPONENTS, Inc.**  
206-A Lincoln Ave., Harrisburg, Pa.

Check 4572 opposite last page

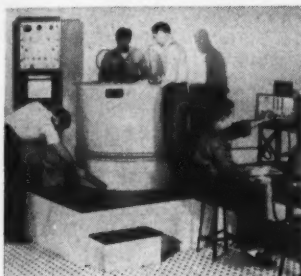
CHEMICAL PROCESSING



**Packaged nuclear labs  
speed atomic training  
in schools**

Comes complete with reactor and other accessories

Packaged nuclear laboratories have hit the market. Complete with instruction book and experimental manual the units weigh less than 5 tons and are designed for use in college and university classrooms. Total cost is about \$30,000.



Subcritical reactor is safe, contains 5500 lb of natural uranium, can be used in ordinary classroom

Heart of the package is a small, water-moderated, natural uranium subcritical reactor. Unlike a critical unit, the unit eliminates any hazard of runaway, needs no complicated shielding, costly cooling system, special buildings, or involved safety program.

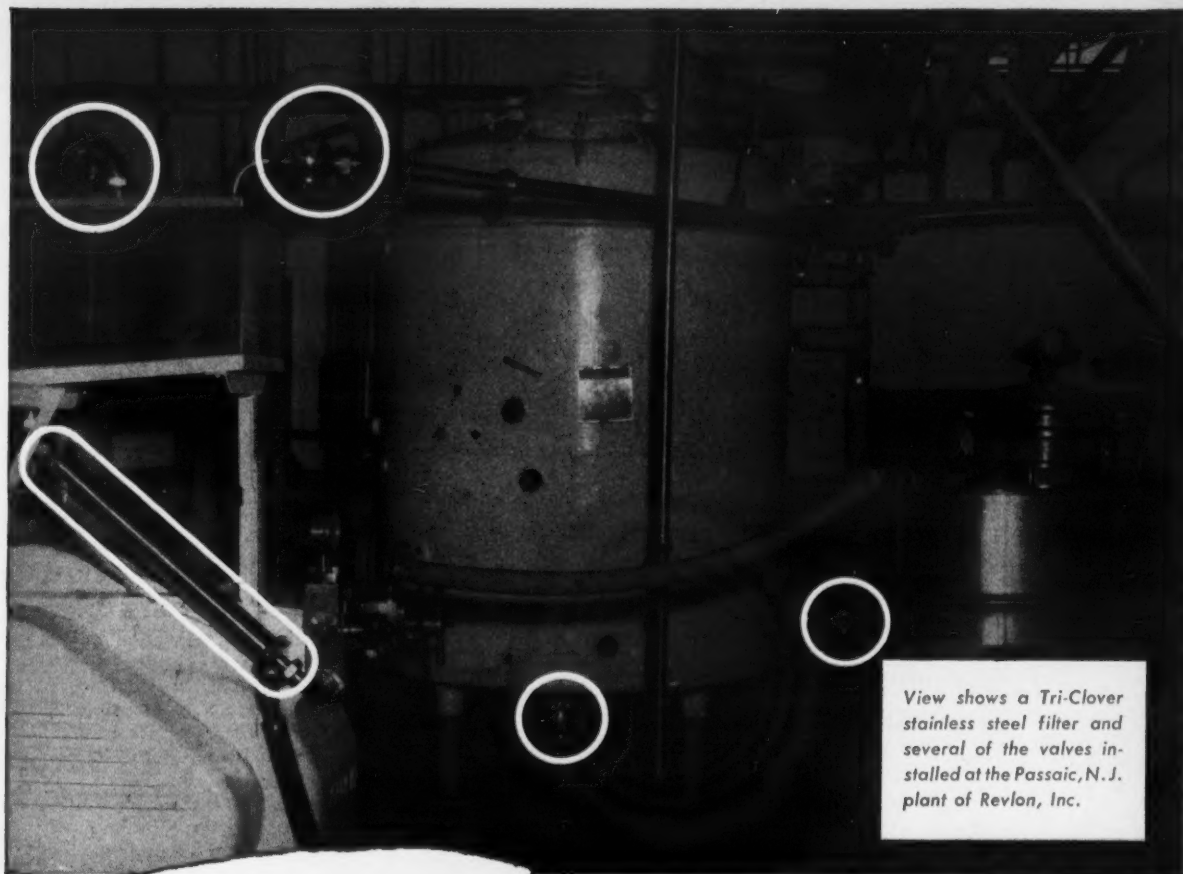
Designed to fit into a typi-

**INFORMATION  
FOR MORE**

Here's what to do when you want additional details about products and services mentioned in this issue's editorial articles or advertisements.

Note the number at end of article or advertisement. Check this key number on Reader Service slip opposite last page of this issue. Fill in slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you. He'll send you the details direct.



View shows a Tri-Clover stainless steel filter and several of the valves installed at the Passaic, N.J. plant of Revlon, Inc.



**REVLON**—"the greatest name in cosmetics" has established an enviable reputation for highest quality products in the field of cosmetics and beauty preparations.

In the modern and efficient Revlon plant at Passaic, N.J., are numerous Tri-Clover Division stainless steel fittings, valves, and filters, all helping to protect the inherent high quality of hand creams and lotions bearing the famous Revlon label.

This is but one example of the way in which sparkling-clean Tri-Clover stainless steel fittings, valves, pumps, tubing and specialties are used in the chemical-process industries to assure the utmost protection against corrosion and product contamination.

Our experienced engineering service is at your disposal to help solve your specific corrosion-resistant piping problems.

See your nearest **TRI-CLOVER Distributor**

**LADISH CO.**

*Tri-Clover Division*  
Kenosha Wisconsin

TRI-CLOVER

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**EXPORT DEPT.**—8 So. Michigan Ave., Chicago 3, U.S.A.

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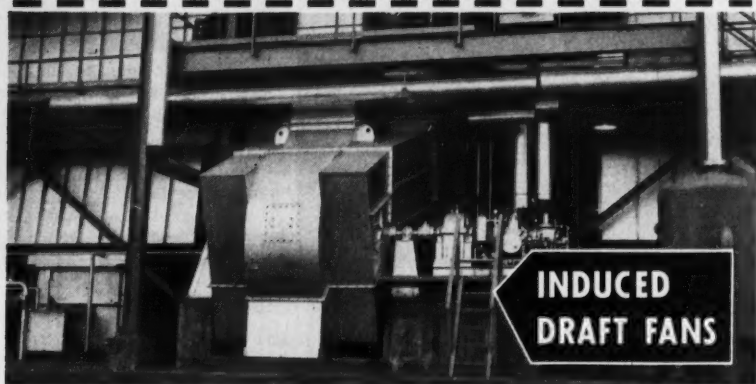
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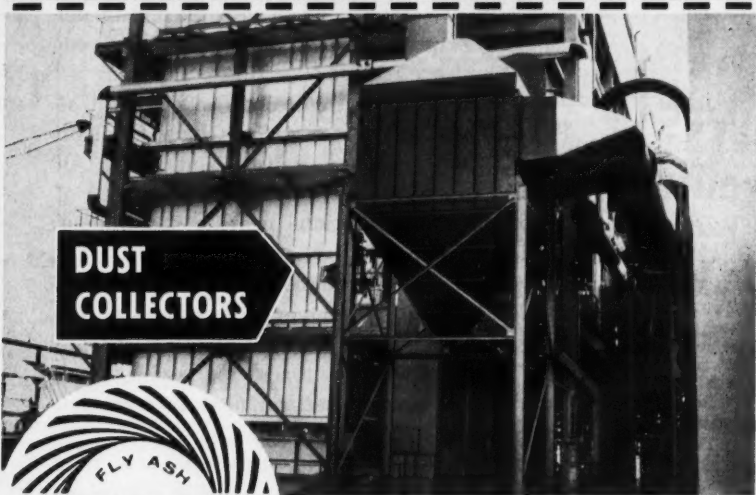
*Available* **FOR YOUR POWER PLANT...**



**FORCED  
DRAFT FANS**



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**DUST  
COLLECTORS**



**FLY ASH ARRESTOR CORPORATION**

260 North First Street • Birmingham, Alabama

Equipment can be engineered and designed to meet variable operating conditions. Prompt quotations upon request.

Check 4574 opposite last page

## IDEAS

cal school laboratory, the reactor consists of a 6'-high by 4'-wide stainless steel tank containing 435 gal of tap water. This acts as moderator and shield.

Immersed in the water is a lattice of 275 water-tight aluminum tubes containing 5500 lb of natural uranium fuel in the form of 1x8" slugs. Neutron source may be polonium or plutonium mixed with beryllium. Source can be moved about anywhere within the reactor. A five curie plutonium-beryllium source lasts indefinitely, having half life of 24,000 years.

Related nuclear detecting, measuring, and recording instrumentation, in addition to the reactor, meet AEC requirements for education and training equipment. In view of this, the AEC will consider giving financial assistance to interested schools. Uranium and the neutron source are supplied free of charge.

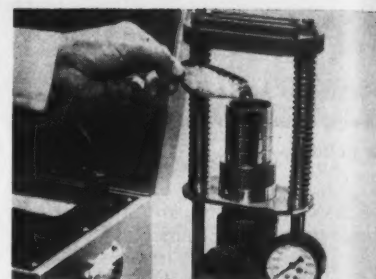
The first packaged unit is scheduled for installation in May 1958 at the Technological Institute of Northwestern University, Evanston, Illinois.

(Model 9000 subcritical reactors are product of Nuclear-Chicago Corporation, 223 West Erie Street, Chicago 10, Ill.)

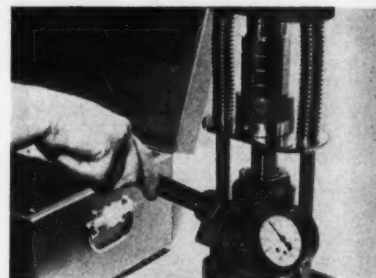
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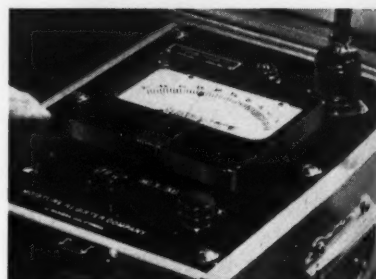
"We just need enough to tide us over until we find something better."



**FEED IT...**



**SQUEEZE IT...**



**READ IT...**

## **G-5 Moisture Register for accurate moisture tests in 60 seconds**

Fastest moisture test available with accuracy to 0%. Save production and lab time—no skilled labor needed. Use Electronic Moisture Register G-5 anywhere on granular, ground, loose, shredded and powdered materials. Hydraulic pressure assures homogeneous sample. Specially calibrated for ammonium nitrate, ammonium sulphate, toilet soaps, calcium carbonate, sulphur, ammonium perchlorate, sodium bicarbonate, polyethylene resins, many more. Accuracy guaranteed. Ask for free trial.

Write, stating material to be tested, and moisture range, or check No. 4576 on reader service slip.

**ELECTRONIC MOISTURE REGISTER** Instruments

Moisture Register Co., Dept. CPC  
P.O. Box 910, Alhambra, Calif.

Check 4576 opposite last page

CHEMICAL PROCESSING

## DATA SAVERS!

CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations.

They have been sent to us by our many readers.

Perhaps, you will find them of value to you.

A wide variety of information can be found in this section. So, no matter what your particular field you will find suitable data to aid you in your daily work.

### And —

the section pages are designed to fit easily into regular data files.

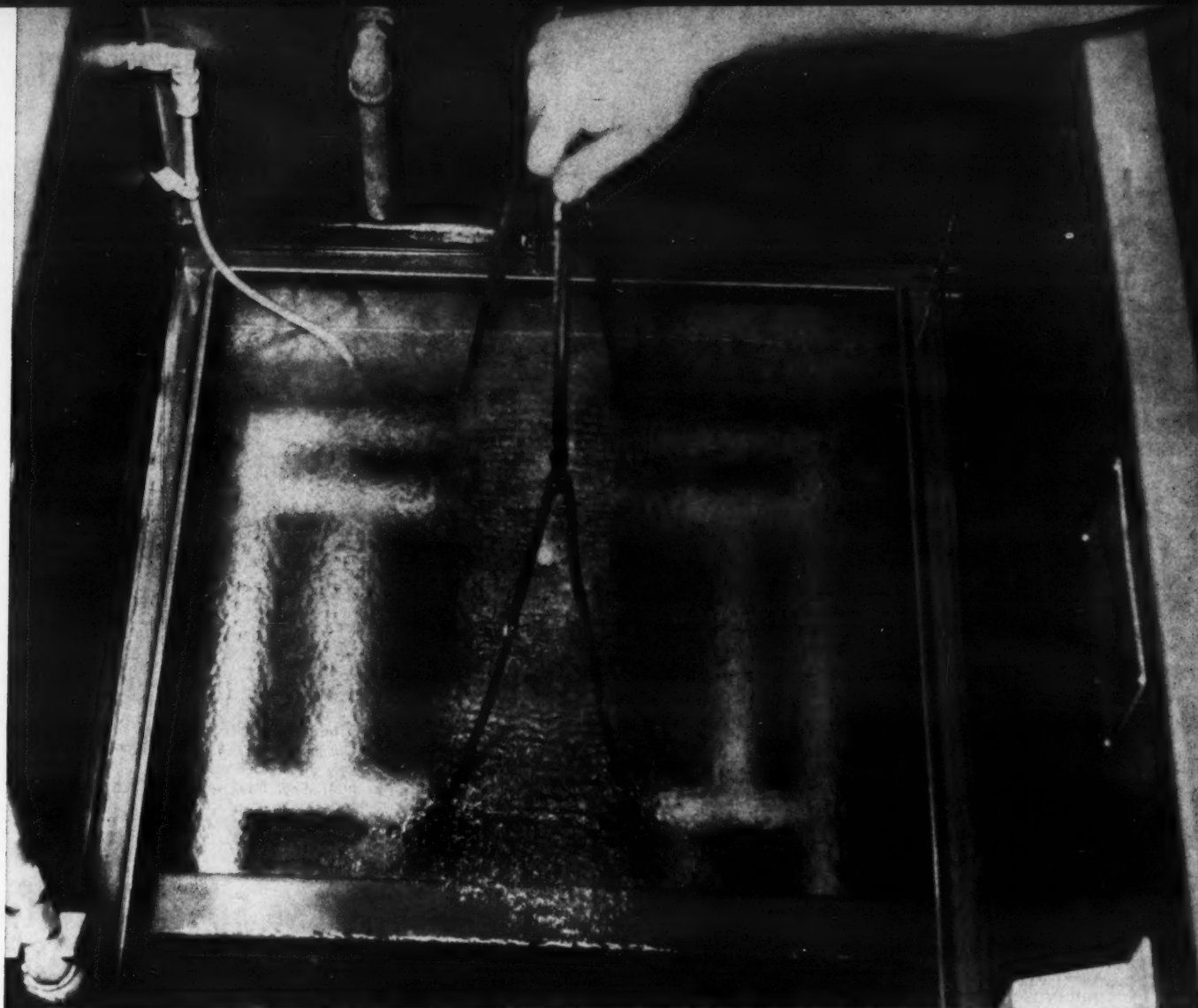
Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

### So —

be sure not to miss this month's "Data" Section. It begins on page 79.

For more information on product at right, specify 4577 see information request blank opposite last page.



This unit cleans machine parts with solvents and ultrasonic waves. The walls are made from Stainless Steel because Stainless resists corrosion and will not contaminate the parts being cleaned.

## Only Stainless Steel can stand high-frequency vibrations in cleaning units

The Detrex Chemical Industries, Inc. of Detroit has developed a method of cleaning machine parts with 10-second exposures to ultrasonic waves in vats of trichlorethylene.

Stainless Steel is the only metal that can be used in these vats. They tried others but found that in time the ultrasonic waves shook loose tiny specks of corroded metal from the vat walls and dropped them on the cleaned machine part.

With Stainless Steel vats there are no tiny specks of corrosion. The Stainless takes these high-frequency vibrations every day and it doesn't even show a pin-point spot in its hard, smooth finish.

When you buy new equipment for your plant, think about corrosion-resistant Stainless Steel. If you want service-tested quality, specify USS Stainless Steel.

*USS is a registered trademark*

United States Steel Corporation—Pittsburgh  
American Steel & Wire—Cleveland  
National Tube—Pittsburgh  
Columbia-Geneva Steel—San Francisco  
Tennessee Coal & Iron—Fairfield, Alabama  
United States Steel Supply—Warehouse Distributors  
United States Steel Export Company



# United States Steel

THE MARK OF QUALITY

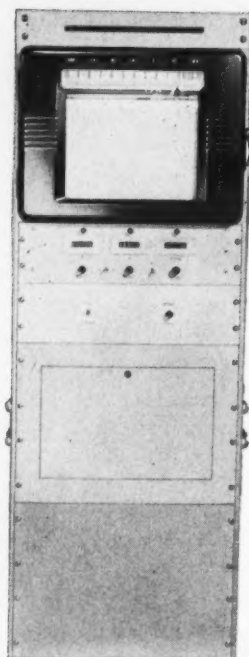


Wheelco  
Instruments

## NEW

**electronic integrator  
provides fast, selective  
counting rates**

New Wheelco electronic integrator and optional 5-digit component counters are unitized for convenient mounting



New from Wheelco — an electronic integrator with a selective counting rate of 2400, 1200, or 600 per minute at full scale. Developed for use with the Wheelco 8000 Series potentiometer strip chart recorder in chromatographic applications, the unit is equally effective on any industrial process where the measured variable must be integrated.

Now—control of laboratory or industrial processes that formerly required a high order of technical skill can be supervised by most competent laboratory technicians.

Recorders are available with cross-chart speeds of 2 seconds for scale spans of 1 to 10 millivolts and 1 second for spans of 10 millivolts and greater. Chart speeds are selected by change gears. Readout (optional) is provided by high-speed, 5-digit electromechanical counters for component and/or total count.

Behind this new development is a solid background of Wheelco development experience, manufacturing skill, and complete field engineering experience. These same qualities can be applied to your process control problem—contact your Wheelco field engineer for more details today.

### BARBER-COLMAN COMPANY

Dept. D, 1520 Rock Street, Rockford, Illinois, U. S. A.

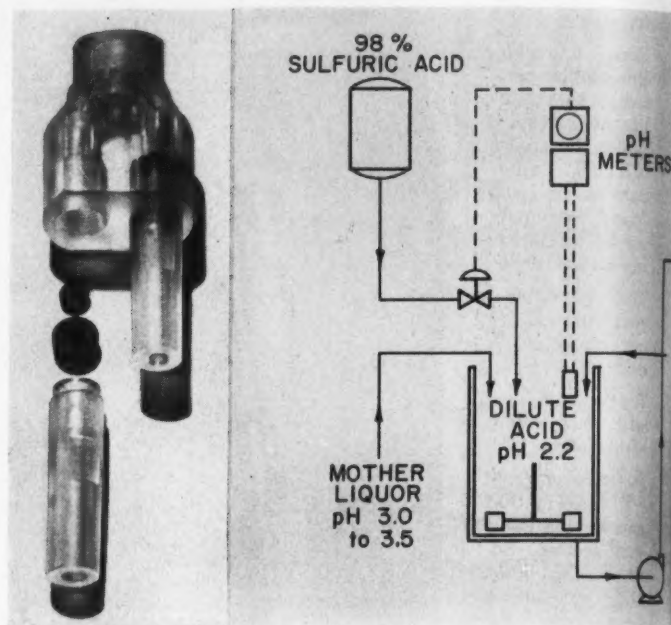
BARBER-COLMAN of CANADA, Ltd., Dept. D, Toronto and Montreal, Canada

Industrial Instruments • Automatic Controls • Air Distribution Products • Aircraft Controls • Electrical Components • Small Motors • Overdoors and Operators Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

Check 4578 opposite last page



PROCESS INSTRUMENTATION  
and LABORATORY APPARATUS



▲ Electrode holder developed by Texas-U. S. Chemical Co. personnel. Glass and reference electrodes fit snugly within each plastic tube, with only electrode tips protruding. Black rubber washers act as gaskets

## Special electrode holder overcomes coating problems

### WILLIAM C. CLARKE

Assistant Editor

With technical personnel  
Of Texas-U. S. Chemical Company  
Port Neches, Texas

**Problem:** Formation of a large mass which covered both electrodes of pH meter prevented use of an industrial pH control system in coagulation step in manufacturing synthetic rubber at Texas-U.S. Chemical Company.

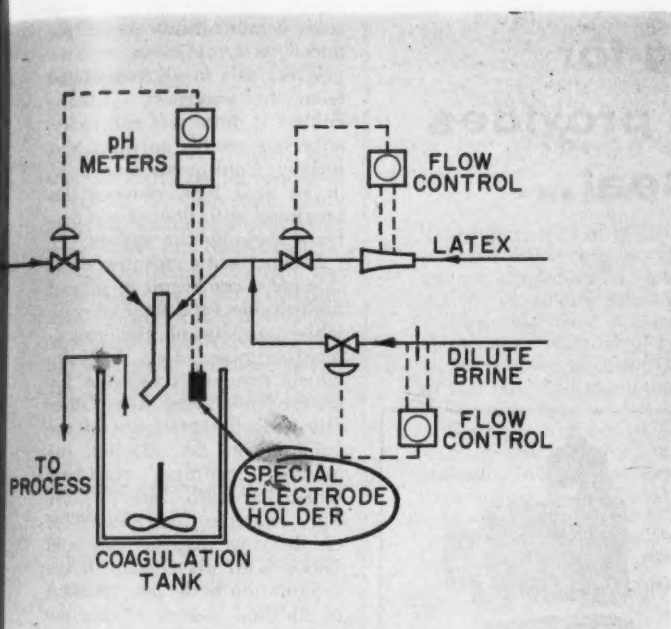
In the coagulation tank, slight variations in acid content of dilute acid added, caused wide fluctuations in pH of the bath. Erratic acid concentration caused several extremely undesirable conditions. Depending on pH, coagulated rubber could be either

too sticky — causing plug-ups, or a hard crumb. Other physical characteristics of the coagulated rubber would even be changed.

Use of a pH meter to indicate acid concentration continuously in the coagulation tank . . . in manufacturing synthetic rubber . . . had been tried over a period of years, but a large mass always formed and covered both electrodes, preventing contact.

**Solution:** In 1954, an improvement in pH control of the make-up tank (see diagram) led to a re-survey of possibilities of controlling pH of coagulation tank. Study of the problem indicated a possible approach was use of a special electrode holder. A





▲ Simplified diagram of pH control system used in coagulation of synthetic rubber. Prior to development of special electrode holder, control of pH in coagulation tank (at right) had been difficult

'Use of a pH meter to indicate acid concentration continuously in coagulation tank . . . in manufacturing synthetic rubber . . . had been tried over a period of years. But, a large mass always formed and covered both electrodes, preventing contact.'

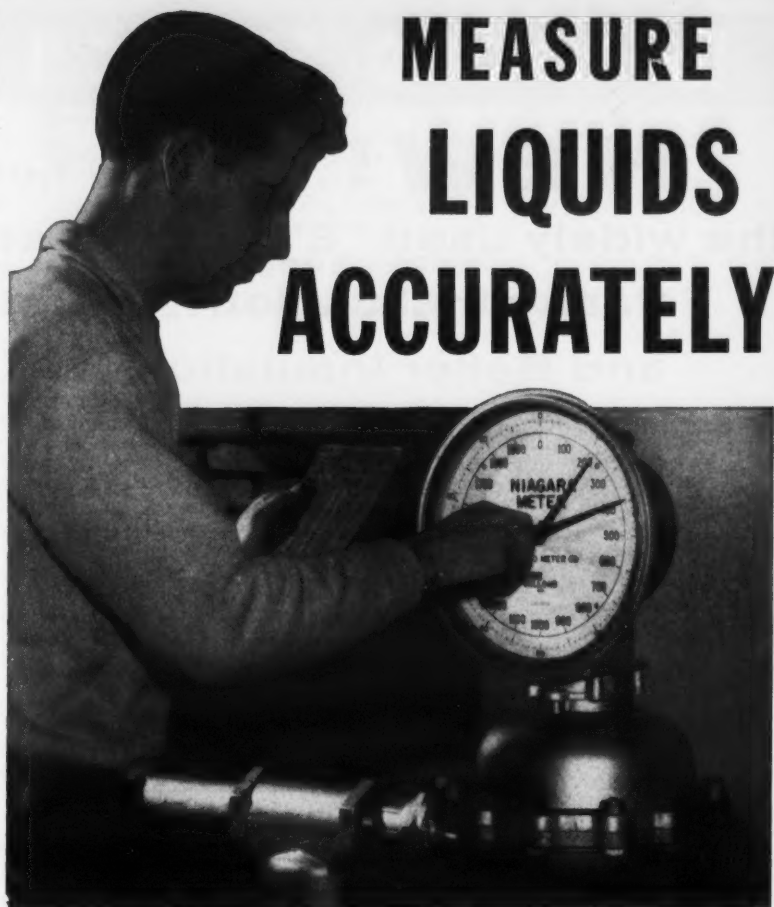
variety of holders was tried. Finally, in 1955, an electrode holder was devised which appeared to offer a practical solution to control of hydrogen ion concentration in the coagulation tank.

#### Eliminated Electrode Coating

Final electrode holder devised is one in which only tips of the electrodes protrude from the body of the unit. Clear acrylic plastic was used for the assembly and proved to be quite free of fouling and bridging. For the first time it appeared practical to convert the coagulation tank installed so as to control the dilute acid stream discharging into the coagulation tank.

In manufacture of synthetic rubber, rubber is first produced as individual particles suspended in an aqueous emulsion. Solid rubber is coagulated by breaking the emulsion with electrolytes in two steps; first, with dilute sodium chloride solution, then with dilute sulfuric acid. These two solutions are made up with mother liquor re-cycled from the coagulation system.

Make-up of dilute acid from re-cycled mother liquor and 98% sulfuric acid is controlled within a pH of 2.2 to 1.8. Mother liquor has a pH ranging between 3.0 to 3.5. A pH meter output controls a diaphragm valve on the sulfuric acid feed line. By installing large agitator sweeps in make-



## UP TO 1000 GPM WITH NIAGARA Displacement Meters

Measurement of liquids in any process is only as dependable as the accuracy of the measuring equipment. Niagara Meters measure volumetrically. Each nutating cycle of the piston displaces a fixed volume which remains constant for any specified liquid and temperature range. Niagara Meters are individually tested and calibrated to close tolerances at all rates of flow within their capacity.

Accurate measurement prevents waste and loss. Liquid formulas can be processed with accuracy insuring greater uniformity of product.

Learn all the facts . . . Mail the coupon for complete information.

**BUFFALO  
METER CO.**  
2892 Main Street  
BUFFALO 14, NEW YORK

Please send me information on the complete line of Niagara Meters.

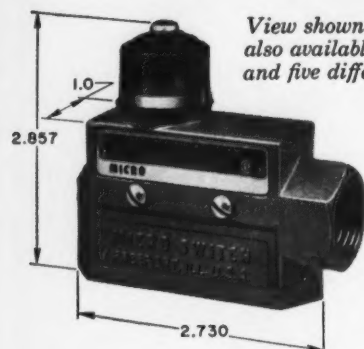
Liquid.....  
Flow g.p.m..... Temp.....°F  
Name.....  
Company.....  
Address.....

Check 4579 opposite last page



# MICRO SWITCH Precision Switches

## NEW!... A new housing for the widely used "E" and "V" series provides Easier Installation... a Better Seal... and Better Insulation



View shown: side mounting; also available with bottom mounting and five different actuator designs.

This new housing replaces the one formerly used in the "E" and "V" Series and is known as the "E6" and "V6" Series. The new series is interchangeable with the old series.

The new "E6" and "V6" have these outstanding advantages:

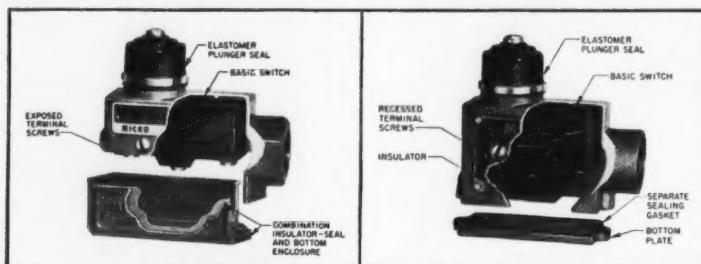
**Easier Installation.** Terminal screws now project from top portion of housing instead of being recessed in a cavity, thereby making easier installation.

**Improved Insulation.** A one-piece moulded neoprene insulator-seal, cemented into lower portion of housing replaces the separate, wrap-around Fiberglas insulator and separate gasket.

**Rugged-Heavier Walls.** The new, two piece housing has heavier walls—a hex-shaped conduit hub instead of round. A much cleaner, stronger design.

**Interchangeable with old series.** Dimensionally the same as old series—same mounting holes, same width, height and depth. Compact—fewer parts.

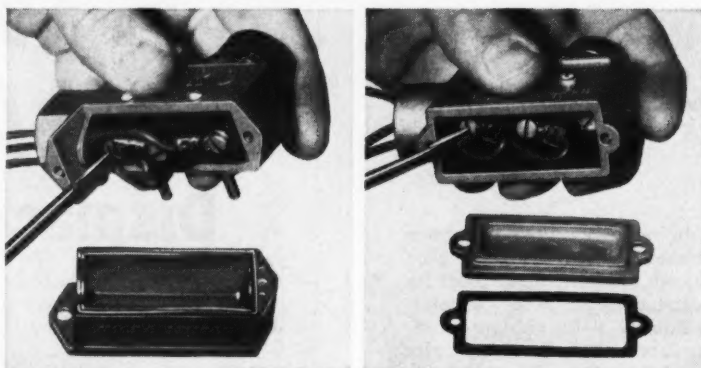
The two word name "MICRO SWITCH" is NOT a generic term. It is the name of a division of Minneapolis-Honeywell Regulator Company.



NEW

OLD

Compare these two cut-away views. Note how terminal screws in the new "E6" Series project from the bottom of the top portion of the housing; how the insulator and seal are one moulded neoprene piece, cemented into the bottom part of the housing.



NEW

OLD

The new series design can be installed in jig-time. No deep cavity in which to fumble with a screw-driver, no fold-in insulator, no jiggling with a separate sealing gasket.

For complete details of this new series write for Data Sheet No. 145.

## MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS



First in Precision Switching

Check 4580 opposite last page

## INSTRUMENTS & LAB

up tank and reducing contained volume, variations in acid content have been reduced to a minimum.

When it is newly coagulated from the emulsion, synthetic rubber is quite soft and tacky, adhering readily to most materials. Continued immersion in an acid bath reduces this tackiness with flow of the material through the system.

Erratic acid concentration at this point can result in several undesirable conditions. A variable porosity of the coagulated rubber can develop which results in variable filtration and drying rates. Other physical characteristics of the rubber can be affected, including modulus, elasticity, tensile strength, rate of cure. For example, conversion of emulsifying soap to fatty acid varies with pH change in the coagulation bath. Soap content of finished rubber affects the rate of cure of compounded rubber.

Also, should hydrogen ion concentration be inaccurate, process difficulties in the synthetic rubber plant can result. A high pH will produce sticky rubber crumb which adheres to tanks, chutes, and causes plug-ups. A low pH condition produces a hard crumb, not too objectional in itself; but the higher acid content increases corrosion rate of equipment. The crumb also dries at a slightly slower rate

### Why Does It Work?

No explanation has been advanced as to the reason for freedom of the plastic assembly from bridging and fouling. However, the rubber particles exist in the aqueous solution as colloidal suspensions.

With a practical solution to the problem of coating electrodes, an electronic potentiometer amplifier-controller was installed in 1955, operating in conjunction with a pH meter. A pneumatic signal from this assembly is used to control a two-inch diaphragm control valve installed in the dilute acid line just ahead of the coagulation tank.

**Results:** The pH control installation has met all expecta-

tions from the first day of operation. Wide swings in operating conditions have been reduced with corresponding improvement in controlling physical characteristics of the finished rubber.

(Electrode holder described was fabricated by personnel of Texas-U. S. Chemical Company. pH meter and electrodes are product of Process Instruments Division, Beckman Instruments, Inc., 2500 Fullerton Road, Fullerton Calif. For aid on problems of this nature, contact Beckman Instruments.)

Check 4581 opposite last page.

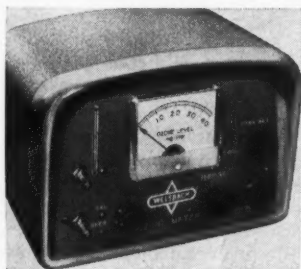
#### Portable ozone meter saves time

Instantly indicates concentration of ozone

Uses: As laboratory instrument for determining accurately the concentration of ozone.

Features: Ozone meter is portable and reads ozone concentration directly in mg/l on dial.

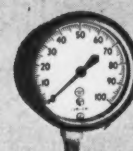
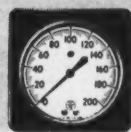
Description: Operation of ozone meter is based on opac-



Ozone meter reads concentration direct

ity of ozone to ultraviolet rays in region of 2537 angstroms. Two detectors are used to compare concentration of ozone through a fixed path versus that of test area. Ozone concentration is thus read directly from scale on face of instrument. Since concentration is read direct, operator's time is saved.

Standard instrument can be used over range of 0 to 40 mg/l. Modified instruments are available for any ozone



NOTHING BUT THE BEST IN GAGES FOR WORKING PRESSURES FROM 30" VACUUM TO 10,000 p. s. i.

## These details of Helicoid gage design assure longer life and enduring accuracy

The superiority of Helicoid Gages is most evident in severe service—wherever a gage is subjected to violent pressure pulsations or severe mechanical vibrations.

The *sustained accuracy* of Helicoid Gages over *millions of cycles* is explained by the details of design and construction of the Helicoid movement shown at the right.

Rolling action of the cam facing against the roller surface . . . graphited Bakelite bushings, roller pivot base and cam facing . . . K Monel connecting links and screws . . . all such Helicoid features protect against wear and corrosion and assure sensitivity, sustained accuracy and trouble-free operation through millions of cycles.



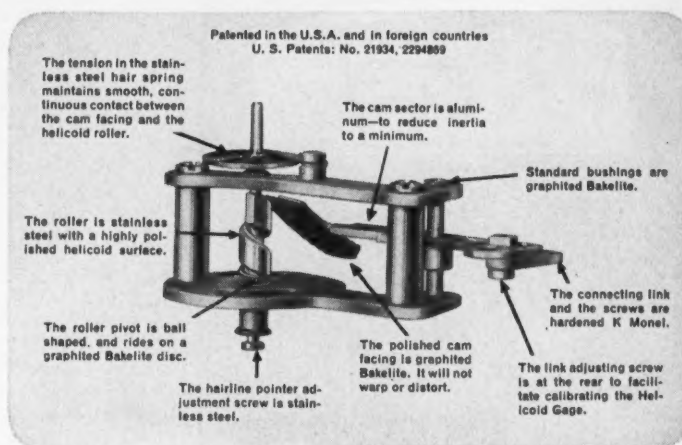
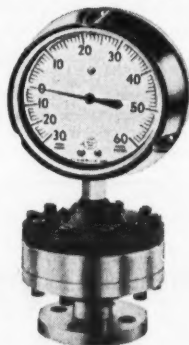
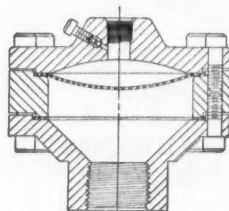
#### EASIEST ADJUSTMENT AND CALIBRATION

Only Helicoid Gages have the external pointer adjustment pictured here. The Helicoid type adjustment cannot be jarred out of position.

Calibration of Helicoid Gages is accomplished easily, without removing dial or pointer, because the link adjusting screw is at the rear of the system.

#### THE CHEMICAL GAGE

The Helicoid Chemical Gage has a guaranteed accuracy of plus or minus 1%. It is applicable for working pressures from 30" vacuum to 5000 p.s.i. and temperatures to 400° F. It is particularly suitable for chemicals and other viscous fluids which might clog or corrode a Bourdon tube. Pressure and/or vacuum is transmitted directly to the indicating gage element through deflection of a Teflon or Kel F sealing diaphragm. The indicating system above the diaphragm is filled completely with specific inert liquids.



#### TUBES BUILT FOR MILLIONS OF PRESSURE PULSATIONS

To fit the wide range of applications, Helicoid Bourdon tubes are available in four materials—alloy steel, K Monel, stainless steel and phosphor bronze.

All Helicoid tubes are made from seamless tubing and are carefully designed to give maximum torque and minimum stress. When used within the dial range, they will withstand many millions of pressure pulsations and will not stretch, leak or crack.



For complete information on the Helicoid line of gages write for Catalog G-52

**Helicoid Gage Division  
AMERICAN CHAIN & CABLE**

929-P Connecticut Avenue • Bridgeport 2, Connecticut

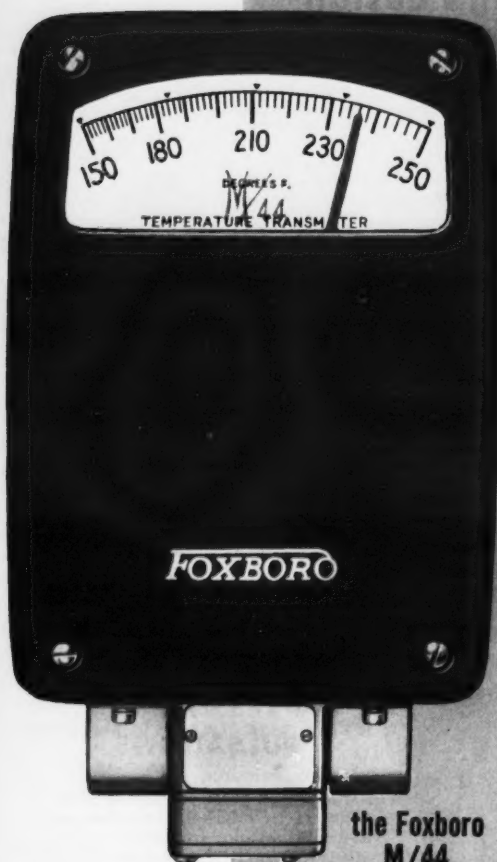


Helicoid gives you all these features at prices that are competitive in the quality gage field

Check 4582 opposite last page



new  
from  
Foxboro!



the Foxboro  
M/44  
Indicating Temperature  
Transmitter

## a compact, low-cost INDICATING TEMPERATURE TRANSMITTER

engineered for fast, sensitive response  
under roughest field conditions.

— uses any filled thermal system

Here's a brand new instrument engineered specifically for its job of indicating and transmitting temperature.

The M/44 Indicating Temperature Transmitter offers the inherent simplicity of a motion balance instrument. Compact and lightweight (10 lbs.) its indicating scale and fluorescent red pointer are visible up to 20 feet away. The output pressure of the M/44 is transmitted to any remote 3-15 psi recorder, controller, or indicator.

The M/44 is made with standard performance-proved Foxboro components, simply and conveniently arranged in a weather proof steel case. Changing range or type of thermal system can easily be done in your own plant.

Thanks to its rugged construction, the new M/44 is unaffected by vibration, sudden shock, or corrosive atmosphere. Even in the event of air supply failure, this instrument continues to indicate process temperature.

Ask your Foxboro Field Engineer about this new instrument. Or write for Bulletin 456-20A, The Foxboro Company, 814 Neponset Ave., Foxboro, Mass.

### Choice of Thermal Systems

Foxboro M/44 Transmitters are available with any filled thermal system. These classes are suggested for particular range characteristics:

#### Class II Vapor Pressure (100° to 600° F)

Lowest cost, fastest response, highest sensitivity. Recommended for all installations within this range except when the measured temperature crosses ambient temperature.

#### Class IA & IB Liquid Expansion

(-250° to +600° F)

Good response, good sensitivity, uniform scale. Uses smallest bulb of any filled thermal system.

#### Class III Gas Pressure (-450° to +1000° F)

Applicable to ranges beyond the limits of other filled systems. Uniform scale. Bulb has long sensitive section; permits useful averaging measurements.

green area  
is actual size  
silhouette of  
the new M/44

**FOXBORO**  
REG. U.S. PAT. OFF.

TEMPERATURE MEASUREMENT  
AND CONTROL

Check 4583 opposite last page

### INSTRUMENTS & LAB

concentration of 0 to 4, or 0 to 60 mg/l. Absolute accuracy is within  $\pm 5\%$  of full-scale reading. Greater accuracy can be obtained by individual calibration of a specific meter.

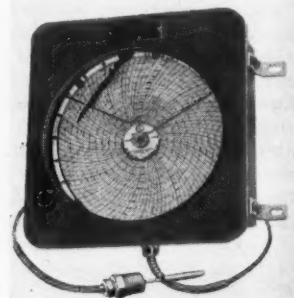
(Ozone meter is product of The Welsbach Corporation, 1500 Walnut Street, Philadelphia 2, Pa.)

Check 4584 opposite last page.

### Inkless chart-recorder eases thermal control of process

Uses: Recording and indicating process temperatures in ranges from -40 to 550°F.

Features: Temperature-recorder charts temperature cycles without ink. Instrument has uniform response over entire temperature range.



Mercury batteries energize inkless recorder

Description: Electric graph-line recorder has 6" calibrated sensitized chart. Two small mercury batteries enclosed in case energize a transistor oscillator connected to stylus arm. Battery life approximates 3000 hours.

Capillary tubing permits remote reading. Recorder is made with wall mounting case, and in portable and self-contained cases. Electric or mechanical chart-drive is available for either 24-hour or 7-day rotation. Electric chart-drive is for 60-cycle 115-volt AC.

(Model 2200 electric temperature recorder is product of Industrial Thermometer Division, Electric Auto-Lite Company, Toledo 1, Ohio.)

Check 4585 opposite last page.

## MOVED RECENTLY?

If you have, you will want to make sure that your **CHEMICAL PROCESSING** will continue to come to you on time.

We are always interested in keeping up to date on our readers.

## Maybe . . .

you have received a promotion and been transferred to a new plant.

Naturally you will not want your copy of CP delayed in its journey to you.

Or if you have changed your affiliation, we want to make sure that your copies of **CHEMICAL PROCESSING** will follow you.

## Fill out . . .

the slip opposite the back cover.

Be sure to answer all questions regarding your new location, title, and company.

In addition, give us your former address, including company, city and state.

Mail this slip to the Reader Service Department and we will make sure you will continue to receive each issue of the magazine promptly.

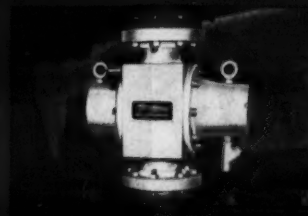
For more information on product at right, specify 4586 see information request blank opposite last page.



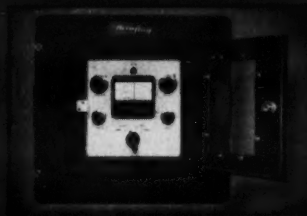
# AccuRay® offers continuous flow density systems

Accurately measuring liquid density, specific gravity, percent solids or related quantity, the AccuRay Density System applies nuclear radiation measurement to process control. Without contacting the process material, measurement is made continuously, independent of flow rate, pressure or viscosity. The AccuRay System is stable and rugged—designed to withstand shock and vibration under the most adverse industrial conditions.

This AccuRay system provides control through the direct control of evaporator feed and effluent, extraction solvent feed, reactor catalyst-feed ratios, distillation unit feed and product quality, proportioning of reactants and products, and feed and product quality measurements in the many repetitive processes of filtration, centrifuging, cycloning, flotation, and classification.



AccuRay measuring head assembly installed in pipe, factory floor.



The AccuRay control unit, which includes conversion to flow density, may be located remotely from measuring head.

AccuRay is a Registered Trademark of Industrial Nucleonics Corporation.

**Industrial  
Nucleonics**  
CORPORATION

1157 Chesapeake Ave. Columbus 12, Ohio

Please send complete details on AccuRay Continuous Flow Density Systems

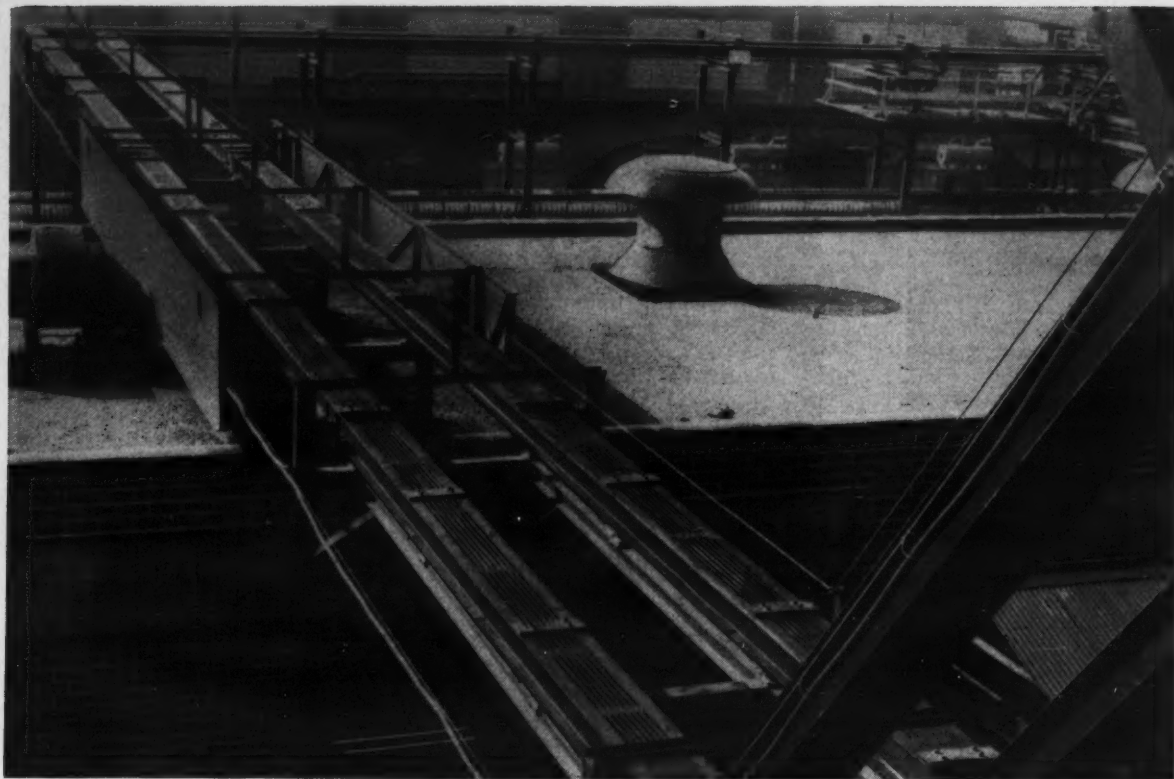
Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Application \_\_\_\_\_



- ▲ Insulators are installed at bottom and sides to support the bus and brace against short circuit forces.
- ◀ Sloping aluminum bus is unsupported between buildings of different heights. Steel frames provide rigidity.

## Alcoa Aluminum Bus Serving Ethyl's Sodium-Chlorine Plant

To transmit 30,000 dc amperes at 550 volts from one rectifier station to another, at a circuit distance of 700 feet, Ethyl Corporation engineers weighed the facts, then chose lightweight, corrosion-resistant aluminum bus conductors. In considering conductors, they found three big advantages with aluminum: it cost less per foot of conductor; weighed about 50% less than copper of the same current-carrying capacity; and, as a result of this lighter weight, also reduced the cost of supporting structures for the system.

This is the second aluminum bus conductor installation by Ethyl. The performance of the first, as well as its economy, led to this second installation. The bus system serves sodium-chlorine electrolytic cells. The natural oxide film on the aluminum protects the bus from further corrosion. This protective film also improves the heat-radiating characteristics of the bus, permitting cooler operation or additional load-carrying capacity.

Savings also appeared during installation. Shielded arc consumable electrode welding, because of its flexibility and

speed, was used for the welded joints. Most of the welding was done on the ground where the supporting beams were assembled, facilitating installation and increased safety.

As in many industries, the electrochemical industry has found that bus systems of Alcoa® Aluminum are the modern answer to the need for economical power distribution. For complete information about Alcoa Bus Conductors, consult your local Alcoa distributor or sales office, or write to Aluminum Company of America, 2305-D Alcoa Building, Pittsburgh 19, Pennsylvania.



Your Guide to the Best  
in Aluminum Value

"ALCOA THEATRE"  
Exciting Adventure  
Alternate Monday Evenings

### INSTRUMENTS & LAB

#### Speed measuring methods

Four methods of measuring speed to one tenth of one percent accuracy through use of manufacturer's potentiometer recorder are described in series of four bulletins. Bulletins describe application of: differential speed recorder, speed ratio recorder, speed deviation recorder, and multi-range expanded scale speed recorder. Buls G E T-2741—(1, 2, 3, 4)—General Electric Company, Schenectady 5, N.Y. Check 4588 opposite last page.

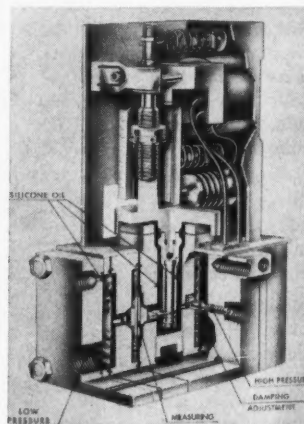
#### Oil-immersed elements cut maintenance

Pneumatic transmitter uses silicone oil

Uses: As d/p transmitter.

Features: Instrument's measuring circuit is completely immersed in silicone oil to reduce maintenance.

Description: Force-balance transmitter is designed for less maintenance and to keep extraneous forces out of



Measuring circuit of d/p transmitter is in silicone oil

force-balance circuit, yet with rapid response to differential pressure changes. Range changes are easily made, and zero adjustment is external. Instrument operates to 1500-psig working pressure with complete over-range protection.

"Through bolt" construction

Check 4587 opposite last page



## INSTRUMENTS & LAB

permits easy removal of unit without disconnecting flanges from process piping. Instrument is furnished with corrosion-resistant glass-fiber cover.

(Oil-immersed d/p transmitter is product of Fischer & Porter Co., 457 Jacksonville Road, Hatboro, Pa.)

Check 4590 opposite last page.

### About water baths

Company's general purpose serological water baths are detailed in four-page bulletin which illustrates various types of equipment. Water bath bul — National Appliance Co., 7634 S.W. Capitol Hwy., Portland 19, Oregon.

Check 4591 opposite last page.

### Pilot plant dryer fills gap between lab and plant

Dryer is sectionalized for easy installation

**Uses:** As pilot plant dryer designed to fill gap between laboratory and production line.

**Features:** Pilot plant dryer is sectionalized for easy installation and versatility.

**Description:** Already field-tested in mill and plant operations, pilot plant dryer is small enough to be used in laboratory yet has sufficient capacity for seasonal or auxiliary production work. It is so designed that additional sections, completely plant-fabricated, can be installed easily. Each section is equipped with motor, fans, heating coils, and conveyor. Sections may be temperature- and moisture-controlled for varying drying zones, each independent of others. Dryer may be made of aluminum, stainless steel, or other materials. Made in two sizes, the smaller unit is four feet high and three and three quarters feet wide.

(Pilot Plant Dryer is product of C. G. Sargent's Sons Corp., Graniteville, Mass.)

Check 4592 opposite last page.

# it takes only ONE

## kates®

(SINGLE UNIT)

### CONSTANT FLOW RATE REGULATOR

## to do the job of a system

Sounds incredible, doesn't it? No controller, no complex valve mechanism, no long approach piping, no electrical or pneumatic circuit—the functions of all these costly flow-system components are contained in this single compact unit, the Kates Flow Rate Regulator. This one unit is your system!

### Kates saves you time and money...

1. Big reduction in first cost of equipment
2. Big reduction in installation costs
3. Virtually no maintenance — install your Kates Regulator and forget about it

If you need to control liquid rate of flow at any pressure, constant or varying, if you need to blend two or more fluids, a Kates Flow Rate Regulator can do the job for you more efficiently, and without the expense of a system.

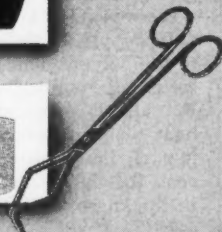
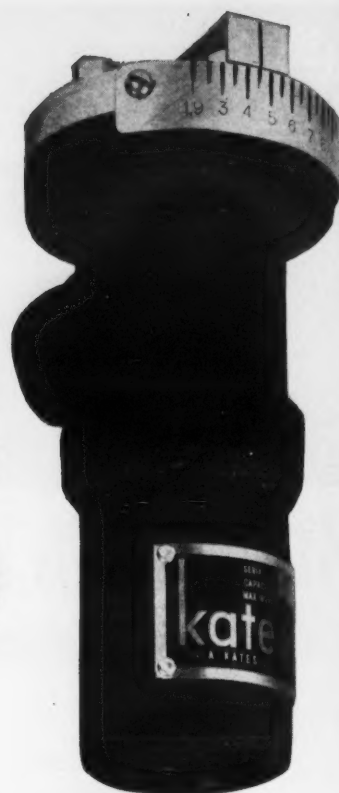
Write for technical bulletin No. 561 for complete information on operation and application.

## kates®

W. A. KATES COMPANY

Department D.  
430 Waukegan Rd.  
Deerfield, Illinois

Check 4593 opposite last page



## PLATINUM

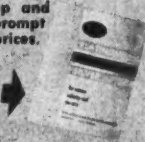
LABORATORY WARE FOR  
SCIENCE AND INDUSTRY



Whenever there is a requirement for platinum laboratory ware and apparatus, look to APW for both quality and prompt service. We manufacture an exceptionally wide range of platinum equipment for industrial, analytical and micro analytical use, as well as special process equipment made to your specifications.

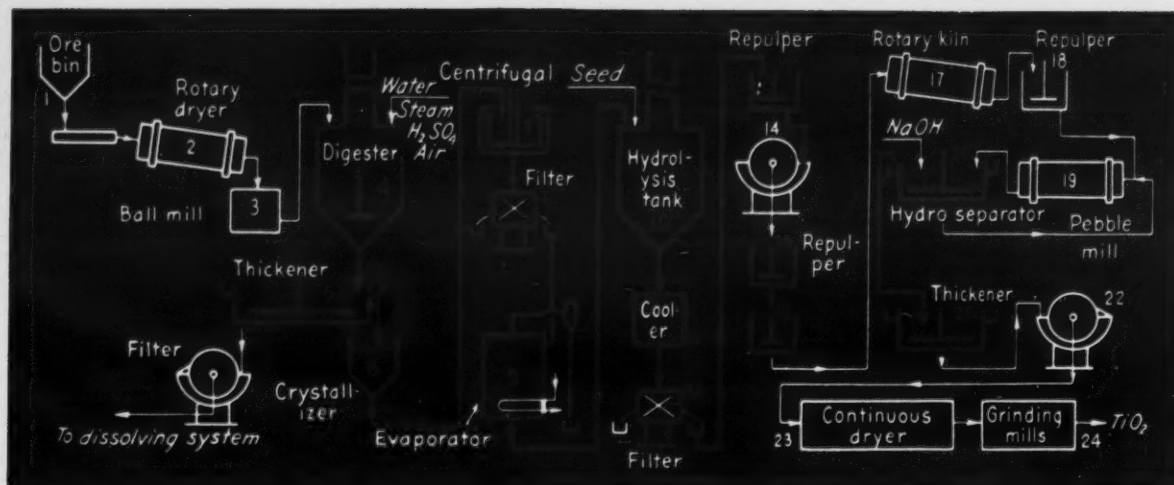
**PRECIOUS METAL RECOVERY SERVICE**  
Here, modern APW facilities for the recovery of platinum and other precious metals from scrap and spent catalyst, assure prompt recovery and highest prices.

SEND FOR FOLDER  
"PLATINUM, GOLD AND  
SILVER FOR SCIENCE,  
INDUSTRY AND THE ARTS"

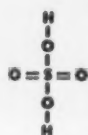


ENGELHARD INDUSTRIES, INC.  
AMERICAN PLATINUM & SILVER DIVISION  
331 NEW JERSEY RAILROAD AVE. • NEWARK 5, N. J.  
NEW YORK • PROVIDENCE • CHICAGO • SAN FRANCISCO • LOS ANGELES

Check 4589 opposite last page



## How lead is used to control corrosion in Titanium Dioxide Production Equipment



TiO<sub>2</sub> is not corrosive. But H<sub>2</sub>SO<sub>4</sub> is a real metal-eater . . . first on the attacking line in the production of TiO<sub>2</sub>.

First on the defensive line, however, is lead, dependability itself when it comes to combating many corrosive chemicals.

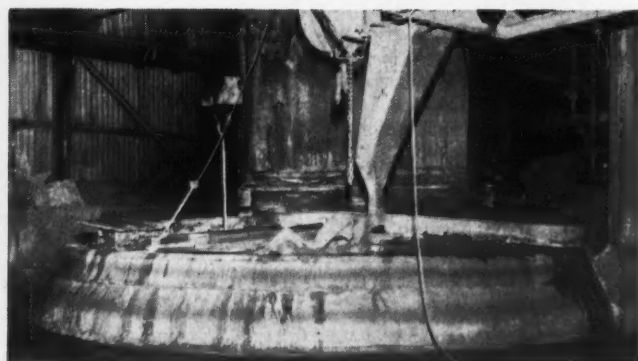
Lead reacts on contact with H<sub>2</sub>SO<sub>4</sub> and other "corrosives" to form an insoluble, impermeable film. This film adheres to the metal surface . . . stopping or slowing down further reaction or attack.

Starting with digesters, where ilmenite ore is treated with sulphuric acid, lead is a steady defender . . . as lining for vessels and tanks, valves and pumps, in heating and cooling coils, in centrifugals and filters. It is used in combination with steel, concrete, wood or brick in many of the steps in the manufacture of TiO<sub>2</sub>.

And bear this fact in mind: the use of lead cuts down-time. Lead lends itself to prompt, low-cost repairs. In case of leak or lesion, the affected area may be fixed quickly, with minimum loss of production. And . . .

...when you think of Lead...

think of National Lead



National Lead's long experience in bringing lead and steel together . . . in acid-handling lines, in complex, massive process, storage and shipping vessels . . . is at your service. When lead and steel are bonded together in this equipment, the union is stronger than lead's tensile strength. Cracking of the lining, due to vibration, pressure and rapid cyclic temperature changes, is held to a minimum. Creep is virtually eliminated.

Perhaps lead can save you money. Contact National Lead Company, Lead Lined Products, 111 Broadway, New York 6, N. Y., for information.

Check 4594 opposite last page

## INSTRUMENTS & LAB

### Polypropylene labware is available

Cost is said to be little more than polyethylenes

**Uses:** As unbreakable labware that is resistant to higher temperatures than items made of polyethylene.

**Features:** Polypropylene labware is available as beakers, centrifuge tubes, graduated cylinders, and other laboratory items. Cost is said to be comparable to the cost of ware produced from polyethylene.

**Descriptions:** Chemically, polypropylene is comparable to the polyethylenes. However, softening temperature is 340° F, allowing production of heat-resistant labware. Clarity is such that newsprint can be read through a section 1/8 inch in thickness.

(Polypropylene labware is product of The Nalge Co., Inc., 625 South Goodman Street, Rochester, N. Y.)

Check 4595 opposite last page.

(Pro-fax polypropylene used in making ware is product of Hercules Powder Co., 900 Market St., Wilmington, Del.)

Check 4596 opposite last page.

### Measures fluid density automatically

Radioactivity gage for use with small diameter pipe

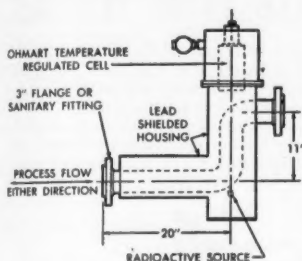
**Uses:** Measuring fluid density, specific gravity, or percent solids in a liquid continuously and automatically.

**Features:** Designed for use with small diameter pipes, gage uses a radioactive source and has no moving parts.

**Description:** Gage output signal can actuate valves, pumps, heaters in a closed loop system for controlling density variable. Through-flow pipe can be made of any standard alloy with flange, welded, or sanitary fittings. Instrument will operate at temperatures to 350°F. Short-radius bends and absence of projections in pipe prevent trapping of solids and consequent errors in indication. En-

tire unit is lead-shielded for safety. All elements are protected against severe environments. Instrument range can be narrow as 0.5 sp gr units.

Since there are no moving parts and no contact with material being measured, gage is unaffected by flow, turbu-



Cross-section of density gage

lence, viscosity, abrasion, or agglomeration.

Accessories include automatic temperature compensation, recording and controlling equipment, multipoint switches.

(Model ASR-3 gage is product of The Ohmart Corporation, 2236 Bogen St., Cincinnati 14, Ohio.)

Check 4597 opposite last page.



"To neutralize the batch you use **EXACTLY** eleven 'glugg-gluggs' of acid."

Thanks for this one goes to Ken Boyer, Hercules Powder Company, Holyoke, Mass.

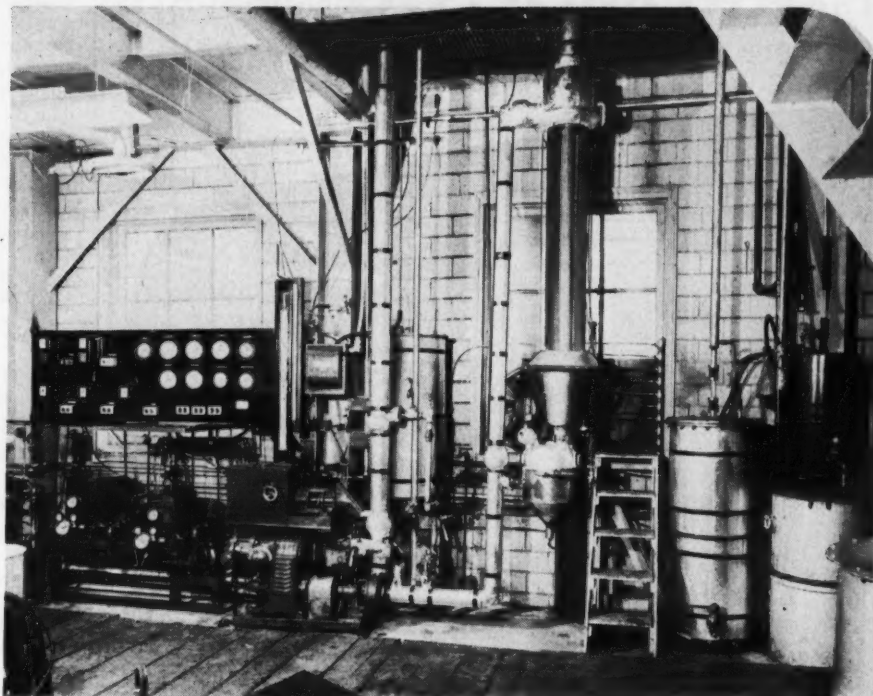
# Solve Industrial Crystallization Problems

## THE STRUTHERS WELLS WAY!

### TYPICAL CRYSTALLINE PRODUCTS

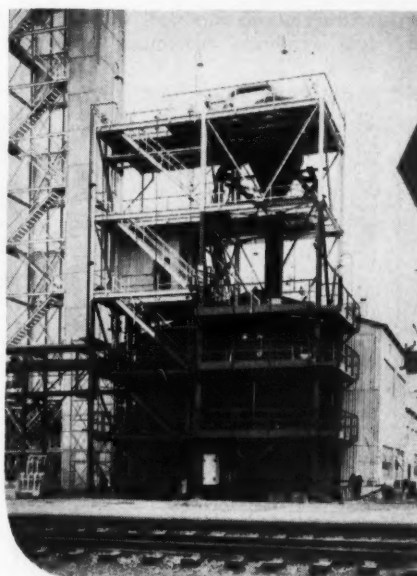
Adipic Acid  
Ammonium Sulfate  
Borax  
Citric Acid  
Copper Sulfate  
Fumaric Acid  
Monosodium Glutamate  
Nickel Sulfate  
Oxalic Acid  
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Potassium Carbonate  
Potassium Chloride  
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Sodium Sulfate, anhydrous  
Sodium Sulfate Decahydrate (Glauber Salt)  
Sodium Sesquicarbonate  
Sodium Tungstate

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**FIRST THIS:** Submit your product and operational specifications to Struthers Wells for complete experimental continuous or batch run in this pilot Crystallization Laboratory at the Struthers Wells plant.

**THEN THIS:** Once crystal size, product uniformity, peak operational efficiency and lowest operating costs have been proved, let Struthers Wells recommend and build the exact Crystallizer installation to do your job best—pre-proved with results assured! Write now for Bulletin CE-57.



# KRYSTAL®

## CRYSTALLIZERS

by

## STRUTHERS WELLS CORPORATION

WARREN, PA.

Plants at Warren, Pa. and Titusville, Pa.

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Crystallizers . . . Direct Fired Heaters . . .  
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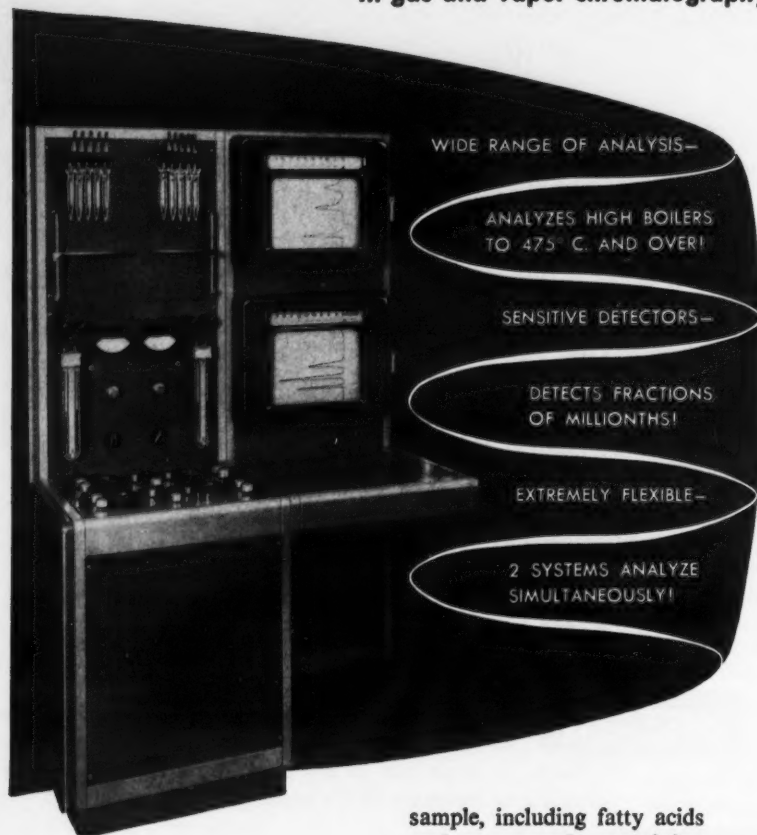
Check 4598 opposite last page



**BURRELL***"For Scientists Everywhere"*

# The KROMO-TOG Model K-5

Opens new frontiers of research  
in gas and vapor chromatography



WIDE RANGE OF ANALYSIS—

ANALYZES HIGH BOILERS  
TO 475° C. AND OVER!

SENSITIVE DETECTORS—

DETECTS FRACTIONS  
OF MILLIONTHS!

EXTREMELY FLEXIBLE—

2 SYSTEMS ANALYZE  
SIMULTANEOUSLY!

The new Burrell Kromo-Tog, Model K-5, is offered as the finest and most versatile research instrument in the entire field of modern gas and vapor chromatography.

It accurately analyzes and records the components of almost any material which can be reduced to a gas or liquid

sample, including fatty acids and compounds containing as high as 36 carbon atoms.

All of the most advanced Kromo-Tog features, plus tested innovations, have been incorporated in its outstanding design. Two complete systems include separate columns, detectors, controls and fraction collectors. One or two recorders, with or without integrators, may be specified as required.

## BURRELL KROMO-TOG, NEW RESEARCH MODEL K-5

K-5 KROMO-TOG	With One Potentiometer Recorder	Cat. No. 350-20
	Same With Automatic Integrator	Cat. No. 350-22
K-5 KROMO-TOG	With Two Potentiometer Recorders	Cat. No. 350-23
	Same With Automatic Integrators	Cat. No. 350-24

Ask for Bulletin No. 837

## BURRELL CORPORATION

Scientific Apparatus and Laboratory Supplies  
2223 FIFTH AVENUE, PITTSBURGH 19, PA.

Check 4599 opposite last page

## INSTRUMENTS & LAB

### Control device data

Solenoid valves, including 2-way, 3-way, 4-way, corrosion-resistant, manual-reset and special-purpose units, and electromagnetic controls, including automatic-transfer switches, remote-control switches, contactors, relays, solenoids, and electric plant controls are described and illustrated in four-page bulletin. Form VS-51 — Automatic Switch Company, Florham Park, N. J.

Check 4600 opposite last page.

### Portable thickness gage measures pipewall

Lightweight unit even measures plastic pipe

Uses: For quick, easy, non-destructive pipewall thickness measurements on pipes ranging from two to eight inches nominal in diameter.

Features: Thickness gage is portable and, using principle of radiation absorption, will even measure non-ferrous or plastic piping.

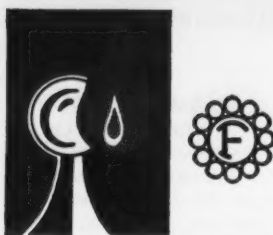
Description: Pipewall thickness readings are made by



Portable pipewall gage is used by placing detector in position on pipe. Meter reading gives thickness

placing detector in position on pipe, pressing measuring button, and noting reading on meter. Integrating circuit eliminates need for averaging and interpreting fluctuating indications.

Reproducibility and resolution is better than  $\pm 0.010$  inch throughout range of from



## FISHER/TAG

ASTM

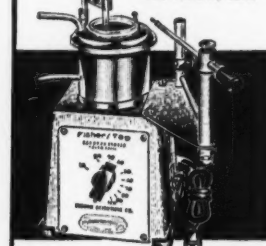
### FLASH POINT TESTERS

There is an improved Fisher/Tag Flash Point Tester for every official ASTM method: open and closed models, electrical, alcohol and gas-operated. Each instrument gives you complete control of every step in your flash point tests of petroleum products, asphalts and animal or vegetable oils.



### FISHER/TAG PENSKY-MARTENS CLOSED TESTER

The Pensky-Martens Tester gives reproducible results with viscous materials with flash points below 300°F. Full, reproducible control of the heating rate makes it easy to use for waxes, too.



### FISHER/TAG TAG OPEN TESTER

The new Fisher/Tag Open Tester increases the reproducibility of tests for determining flash points of paints, varnishes, lacquers, vegetable oils and related products which flash below 175°F.

Send for Detailed Bulletin; write to  
103 FISHER BLDG., PITTSBURGH 19, PA. 4-14



## FISHER SCIENTIFIC

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Buffalo	Detroit	St. Louis	Montreal
Charleston, W.Va.	New York	Washington	Toronto

America's Largest Manufacturer-Distributor of  
Laboratory Appliances & Reagent Chemicals

Check 4601 opposite last page

CHEMICAL PROCESSING

## INSTRUMENTS & LAB

0 to 1 inch thick pipe-walls. Instrument is completely transistorized and light weight (7½ pounds) for portability. Instrument is furnished with leather case and shoulder strap for convenience.

(Portable pipewall gage is product of Industrial Nucleonics Corporation, 1205 Chesapeake Ave., Columbus 12, Ohio.)

Check 4602 opposite last page.

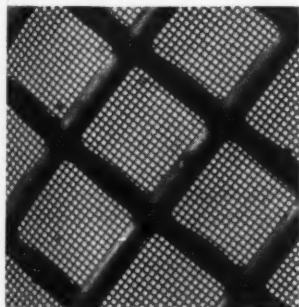
### **Small micron particles measured accurately by precision sieves**

Holes range in size from 20 to 90 microns

**Uses:** Determining particle size of —100-micron material.

**Features:** Sieves are extremely accurate — being capable of measuring particle size within plus or minus two microns.

**Description:** Precision sieves were originally developed to measure size of cracking catalyst in petroleum field. There are six sieves per set,



The fine fabric-like screen is electro-bonded to a supporting grid

with holes ranging from 20 to 90 microns. At the present time, the sieves are only available with three-inch-diam brass holding rings.

Sieves are produced by

For more information on product at right, specify 4603 . . . see information request blank opposite last page. ➤

# UNITRON

the most  
forward  
achievement  
yet in  
semi-conductor  
rectification

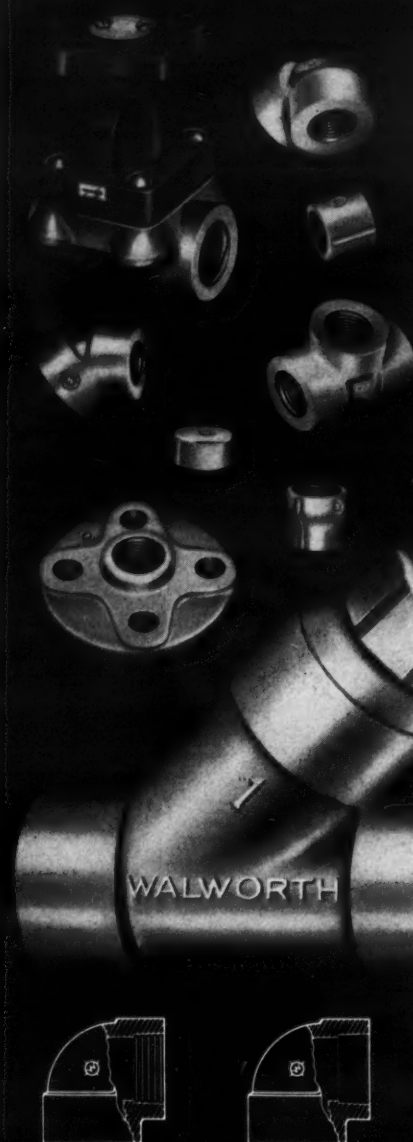


**I-T-E CIRCUIT BREAKER COMPANY**  
PHILADELPHIA, PENNSYLVANIA

Developed in the engineering laboratories of I-T-E. Tailored to meet the particular needs of the electrochemical industry. Now this new semi-conductor rectifier offers you a combination of advantages not available from any other source.

1. Can be used in parallel with any other type of conversion equipment
2. Forced equalization of inverse voltage across series-connected cells
3. Forced equalization of current between parallel-connected cells
4. Cells individually isolated in case of fault, whether connected in series or parallel or both, by current-limiting Amp-Trap ultra-high-speed fuses
5. Closed system water cooling—you can change damaged cells without disturbing the cooling system
6. Ion-exchange water purifier to maintain high purity of cooling water and thus prevent corroding and electrolyzing
7. Available in any desired d-c voltage and current rating

The first new I-T-E UNITRON Semi-Conductor Rectifier has recently been installed, delivering 10,000 amp at 300 v. Other units are scheduled for early installation. Write for technical information. I-T-E Circuit Breaker Company, Transformer & Rectifier Division, 19th & Hamilton Sts., Philadelphia 30, Pa.



90° SCREWED ELBOW

90° SOLVENT WELD-SOCKET TYPE ELBOW






A complete line of Walworth screwed and solvent weld socket type fittings are available in sizes from 1/2" to 4" and include 45° and 90° Ells and Tees . . . flanges . . . plugs . . . bushings . . . straight and reducing couplings . . . screwed and flanged unions . . . caps . . . nipples.

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 SOUTHWEST FABRICATING & WELDING CO., INC.  M & H VALVE & FITTINGS CO.  WALWORTH COMPANY OF CANADA, LTD.

## FOR THE LASTING PROTECTION OF PLASTIC PIPING SYSTEMS....

Specify  
**WALWORTH**  
**PVC**  
 (rigid polyvinyl chloride)

### Valves and Fittings!

Walworth plastic valves and fittings are made of non-aging, non-corrosive and non-toxic unplasticized rigid polyvinyl chloride (PVC). These products are highly resistant to chemical attack and offer the advantages of immunity to galvanic corrosion and high impact strength at temperatures as high as 150°F. Durable and light, Walworth PVC valves and fittings are simple to install, easy to maintain (no painting), and add a smooth, clean appearance to your piping system.

Walworth PVC Y-Globe Valves are designed to regulate the flow of alkalis, acids, and similar corrosive fluids. Walworth PVC Diaphragm Valves\* are commonly used in systems handling corrosive fluids, especially those containing suspended materials, and can be furnished with diaphragms suited to your application.

\*Hills - McCanna (Saunders Patent)

SEND FOR THIS BOOKLET. It describes mechanical and thermal properties, working pressures, sizes and dimensions, application and assembly data for the complete line of Walworth PVC Valves and Fittings. Please use company letterhead.



#### INSTRUMENTS & LAB

patented metal etching and electroforming techniques. A specially built ruling engine, capable of ruling up to 8000 lines per inch, is used to prepare the negative, an etched glass ruling.

The final fine, fabric-like screen is electro-bonded to a supporting grid. This is then soldered into position within the brass holding ring.

(Micro mesh sieves are product of Buckbee Mears Company, Toni Building, St. Paul 1, Minnesota.)

Check 4605 opposite last page.

#### Nuclear instruments

Manufacturer's line of 200 nuclear instruments ranging from Geiger Mueller detectors to transistorized multi-channel analyzers is shown in 132-page catalog. Catalog is divided into four sections: detectors; instruments; accessories; and special section of applications. Cat 17 — Radiation Counter Laboratories, Inc., 5121 W. Grove St., Skokie, Illinois.

Check 4606 opposite last page.

#### Measures liquid levels in remote tanks

Transistorized system will handle up to 100 tanks

Uses: Measuring liquid level in any of 100 remotely located storage tanks.

Features: Tank gaging system is operated by telephone-like dial. Tank levels can be measured with accuracy to 1/16".

Description: Major components of tank gaging system are receiver console, field selector unit, and liquid-level gage embodying a float. Entire system may be installed at tank site. Or, receiver console may be located in remote office. Direct-wire, telephone, carrier or microwave transmission may be used.

System automatically checks itself on selection of tank to be monitored and on each individual reading. System will handle liquid depths up to 64'

Check 4604 opposite last page



in each tank.

System operates by actuating a dynamic mechanical surface finder. When bottom of float breaks surface tension of liquid, data is telemetered



Tank data appears on receiver console in lighted numerals

to receiver console, appearing in lighted numerals.

(DATA-GAGE is manufactured by the Industrial Instrumentation Division of Texas Instruments Incorporated, 3609 Buffalo Speedway, Houston 6, Texas.)

Check 4607 opposite last page.

#### Heat by the yard

Electrical heating tapes that can be cut with scissors to required lengths are described in six-page bulletin that gives data on uses with glass and metal equipment. Electrical heating tape bul — Arthur S. LaPine & Company, 6001 South Knox Ave., Chicago 29, Illinois.

Check 4608 opposite last page.

#### Measures gas flow in lb/unit of time

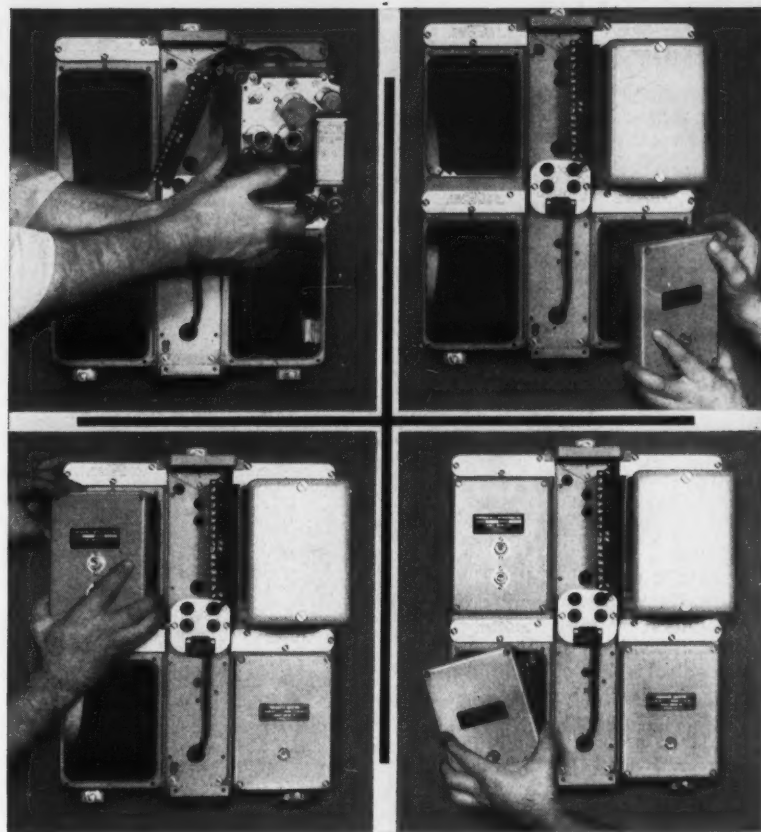
Mass-flow meter operates independently of volume

**Uses:** Measuring mass-flow rate of gases under very high pressure conditions, to 10,000 psi.

**Features:** Mass-flow meter measures gases directly in pounds independently of specific volume, pressure, and temperature.

**Description:** Flow meter operates by measuring torque necessary to decelerate flow to zero angular velocity. As fluid

## CUSTOM BUILD your own Bailey Recorder



These four views of the back of a Bailey Recorder show how four plug-in units may be added as needed to meet almost any recorder application.

The freedom and flexibility of "do-it-yourself" instrumentation is yours in the Bailey Recorder. A variety of plug-in units make it possible to record, control, and retransmit any variable that can be converted to a pneumatic or electric signal.

The basic plug-in units are the Bailey a-c and d-c Electronic Receivers and Pneumatic Receivers. Any four of these may be used in one recorder, intermixed in any way, to provide four continuous records on one chart.

For automatic control, other plug-in units are available.

For square root extraction or linear integration, there are two plug-in variations of the Bailey Integrator.

When you want a pneumatic signal that varies

according to a pre-set pattern plug in a Bailey Program Controller.

Periodic running time of a condition or process is recorded on the chart when a Bailey Running Time Recorder is used.

These and other plug-in units are described in Product Specification E12-5. Some companies stock Bailey Recorder cases and assorted plug-in units. As instrumentation and control needs arise they build up the kind of recorder-controller required, using the proper plug-in units from stock. Unmatched versatility such as this means lower instrumentation costs.

For the complete story of how easily you can custom build this recorder to your needs, see your Bailey Engineer.

G43-1



Instruments and controls for power and process

## BAILEY METER COMPANY

1074 IVANHOE ROAD • CLEVELAND 10, OHIO

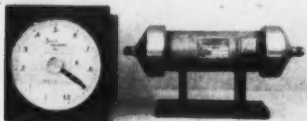
In Canada — Bailey Meter Company Limited, Montreal

Check 4609 opposite last page

## INSTRUMENTS & LAB

passes through flow meter, it is given a precisely determined constant velocity by axial-flow impeller. Measuring turbine downstream then removes angular velocity completely.

Readout is a self-balancing potentiometer on which mass-



Mass-flow meter measures gases directly in pounds at very high pressures

flow rate is presented directly in lb/unit time. Retransmitting potentiometers will actuate controllers, valves, other process control elements. Indicators are available with response times of one second.

Standard accuracy is within 1% over 5 to 1 flow range. Instrument will operate without adjustment over pressure range of 200 to 1. Units are designed for temperature range from -75 to 250°F.

(Inertial mass flow meter is product of Inertial Instruments, Inc., 1738 Colorado Ave., Santa Monica, Calif.)

Check 4610 opposite last page.

### Laboratory mixer data

Complete design and construction details on small compact laboratory mixer are contained in manufacturer's bulletin. Dimensions, weight, and operating speeds are included. Bul 188 — Pulp & Paper Div., Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 4611 opposite last page.

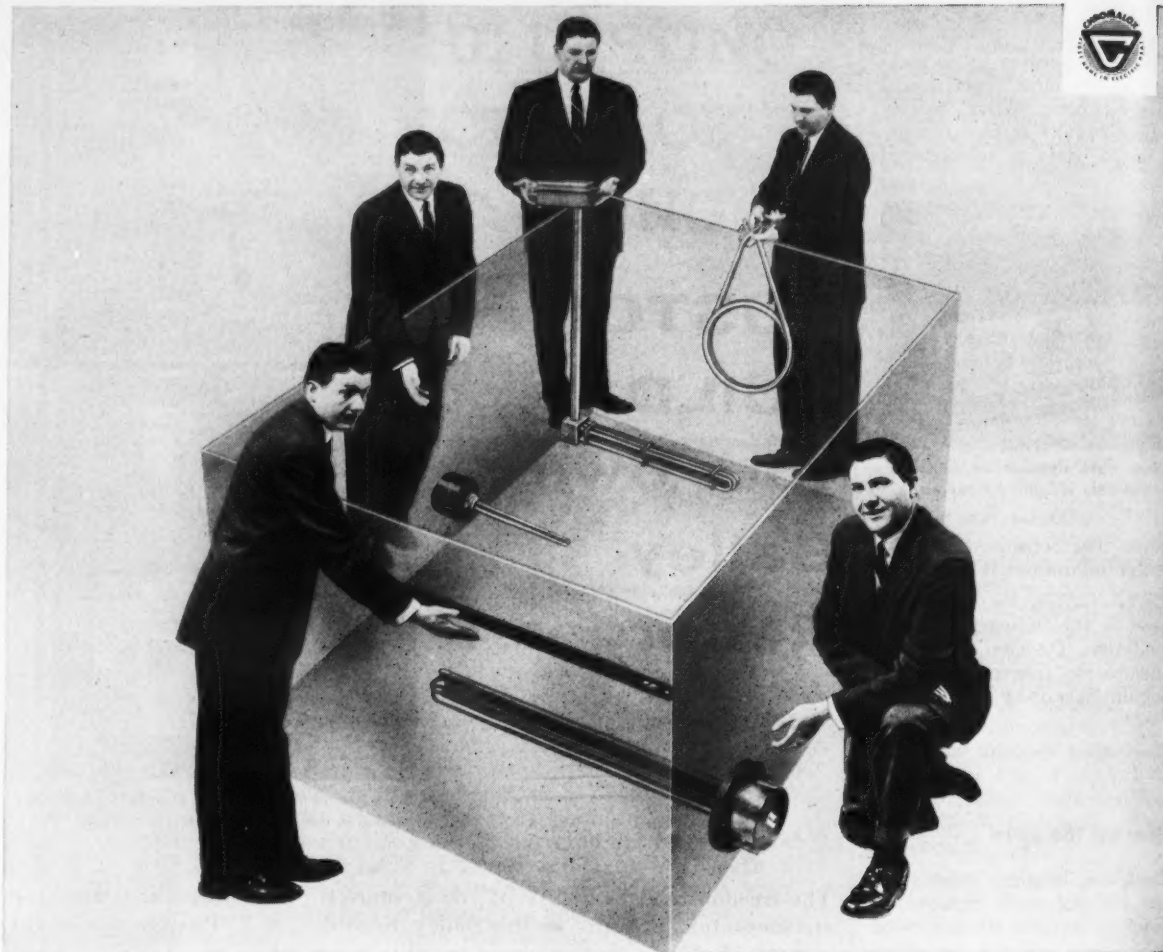
### One liter autoclave can be stirred

Will operate at pressures to 30,000 psi, 250°C temp

Uses: As laboratory autoclave.

Features: Stirring autoclave is of one-liter capacity and

## What's the best way to heat a tank?



## Your Chromalox man has the **ANSWER**

Trying to heat a tank with steam or combustible fuels often presents rough problems, costs needless time and money and leads to ineffective results. But 97 times out of 100 there is a quick and effective electric answer—and your "CHROMALOX man with the answers" has it. Here, for example, are five ways of heating a tank—each presenting significant advantages, and using stock industrial heaters in most instances.

- In the foreground, CHROMALOX Strip Heaters are clamped to the tank wall, heating by conduction, without contacting the tank contents. Tank interiors have full work space—cleaning is simplified.
- Moving clockwise: CHROMALOX Screw-Plug-Immersion Heaters, with standard pipe threads, go to work quickly in heating water and corrosive solutions. Heavy-duty elements of steel, copper, stainless steel, or alloy, all in correct watt density, have proper chemical characteristics.

- Next: Portable Tank Immersion Heaters require no tank openings. They put the heat down to the very bottom of the tank—and they are constructed for trouble-free life with moisture, heat, and acid-resistant parts and joints.
- Next: Coiled over-the-side heaters, for full but shallow tanks, produce good circulation and uniform temperatures. Various sheaths resist practically all chemicals.
- Next, at right front: a High-capacity Flange-Type Heater packs many kilowatts in a small space, particularly in water solutions. The heavy-duty flange simplifies installation.

So what's YOUR heating problem? Just call your CHROMALOX representative, listed opposite. He has the fast, clean, safe, accurate, economical ELECTRICAL ANSWER, backed by the world's largest stock of industrial electric heaters for immediate shipment, plus factory design engineering services.

## CHROMALOX® Electric Heat

### Edwin L. Wiegand Company

7517 Thomas Boulevard, Pittsburgh 8, Pennsylvania • CHURCHILL 2-6400

Check 4612 opposite last page

CHEMICAL PROCESSING



## Call Chromalox

for the man with the  
ELECTRICAL ANSWERS  
to your heating problems

**ATLANTA 8, GA.**  
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MOhawk 4-6113

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HOpekins 7-3280

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Phone 4-7703

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RICHmond 7-9401

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Gordon Hatch Co., Inc.  
531 W. Wisconsin Avenue  
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Volco Company  
831 South Sixth Street  
FEderal 6-3373

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H. R. Miles and Associates  
2500-B Franklin Road  
CYpress 2-7016

**NEW YORK CITY, N. Y.**  
See "Bloomfield, N. J."  
WORTH 4-2990

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of Omaha  
1614 Izard Street  
ATlantic 7600

**PHILADELPHIA, PA.**  
See "Bala-Cynwyd, Pa."  
GRGreenwood 3-4477

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1310 Highland Bldg.  
115 S. Highland Avenue  
EMerson 1-2900

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Montgomery Brothers  
1632 N.W. Johnson Street  
CApitol 3-4197

**RICHMOND 28, VA.**  
(Branch, Charlotte)  
ATlantic 8-8758

**ROCHESTER 4, N. Y.**  
Niagara Electric Sales Co.  
133 Clinton Avenue, South  
HAMilton 6-2070

**ST. LOUIS 1, MO.**  
C. B. Fall Company  
317 N. 11th St., Suite 1001  
CHestnut 1-2433

**SAN FRANCISCO 3, CALIF.**  
Montgomery Brothers  
1122 Howard Street  
UNderhill 1-3527

**SEATTLE 4, WASH.**  
Montgomery Brothers  
911 Western Avenue  
SEneca 3270

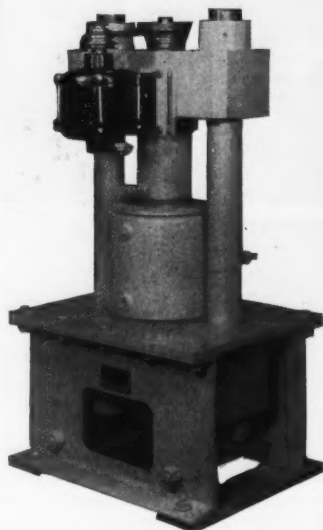
**SYRACUSE 6, N. Y.**  
R. P. Smith Co., Inc.  
2507 James Street  
HOward 3-2748

**WICHITA 2, KANS.**  
Fraser D. Moore Co.  
Room 211 Derby Building  
352 N. Broadway  
AMherst 2-5647

## INSTRUMENTS & LAB

able to withstand high-pressure operation.

**Description:** With a ¾-hp electric motor, stirring speeds of 575, 868, 1258, and 1725 rpm are developed. Unit has been designed for service at pressures to 30,000 psi and tem-



Stirring autoclave is designed for service at medium-high pressures

perature to 250°C. A ½"-diam stirring shaft runs in controlled clearance gland. This permits gland clearance to be controlled by operator at operating pressure, assuring desired pressure within limits required. Autoclave has thermocouples within it and a heating jacket encloses the main body.

(Stirring autoclave is product of Harwood Engineering Company, Inc., Walpole, Massachusetts.)

Check 4613 opposite last page.

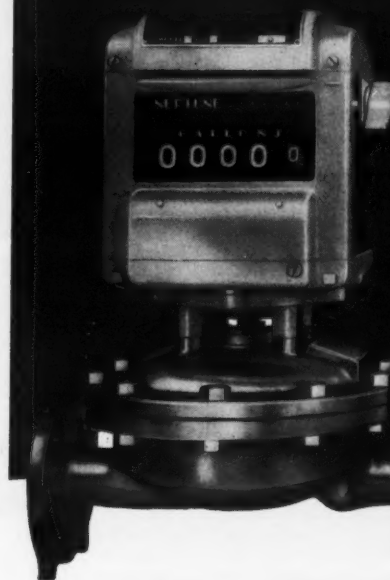
### Electronics instruments

Condensed, pocket-size catalog briefly describes accelerator current integrator, photo-multiplier photometer, millimicrosecond time-to-pulse height converter, and multi-channel pulse-height analyzer. Short form catalog — Eldorado Electronics Co., 2821 Tenth St., Berkeley, Calif.

Check 4614 opposite last page.

# NEW

## NEPTUNE STAINLESS STEEL LIQUID METER



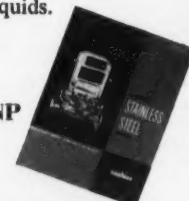
### ONLY TWO MOVING PARTS IN THE LIQUID

Now you can achieve fine-instrument accuracy in the processing of corrosive liquids... in batching, blending, transfer, cost accounting, etc... with this new Neptune Stainless Steel Meter.

Also important in many processes, this Neptune meter ends many problems caused by contamination of liquids being measured.

Based on the reliable Neptune positive displacement principal, its accuracy is completely protected from the effects of corrosion or corrosive wear. There are only two moving elements in contact with the liquid. The gear-train is mounted outside the casing, isolated from the liquid.

Available with Direct Reading, Print-O-Meter or Auto-Switch Registers. Size 1½", capacity 100 gpm. with most liquids.



Ask for Bulletin 94/10 NP

### NEPTUNE METER COMPANY

19 West 50th Street, New York 20, N. Y.

BRANCHES IN: ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER  
NEW YORK • NO. KANSAS CITY, MO. • LOS ANGELES • LOUISVILLE  
PORTLAND, ORE. • SAN FRANCISCO-BAY AREA (MILLBRAE)  
IN CANADA: NEPTUNE METERS LTD., TORONTO 14, ONT.

# neptune

Check 4615 opposite last page



# PVC PIPING NEWS

PUBLISHED BY TUBE TURNS PLASTICS, INC. • LOUISVILLE 1, KENTUCKY



## INSTRUMENTS & LAB

**Senses low flow rates —  
switch then actuates  
for control**

Switch will detect seepage

**Uses:** Detecting partly opened or faulty valves before or after processes. Can also be used as stop, start, safety and seepage control.

**Features:** Flow switch will detect flows in order of 1/4 to 1-gallon per minute. It is even capable of detecting reverse flow.

**Description:** Adapted from air-borne version, flow switch is explosion-proof, light weight, and has been ruggedized for severe industrial applications. Switch is similar to manufacturer's in-line flow meter in that it is placed in line and uses Pottermeter flow-sensing element. Switches are three sizes. One-inch unit will detect flows down to 0.1 gpm. One-and-one-quarter-inch and two-inch flow switches are comparable in their sensitivity. Normal operating range is -85° to +550°F.

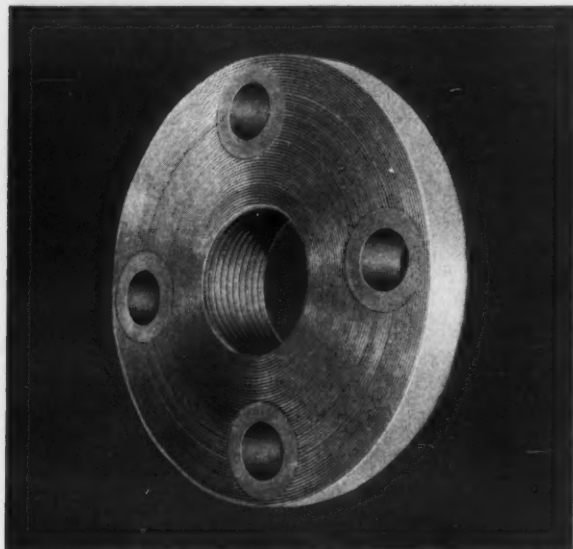
Instrument is available in flange, screw fitting, flared tube, or other configurations to meet special requirements. It can be made of aluminum, stainless steel, nickel, Monel, and other metals.

Suggested applications include use of the instrument as a monitor for determining flow of coolant in nuclear reactors. Immediate detection of this condition is said to be feasible with flow switch.

(FS25 flow switch is product of Potter Aeronautical Corporation, Route 22, Union, N.J.) Check 4617 opposite last page.

### Precision measuring

Precision instruments for measuring, indicating, recording, and controlling the rate of flow of all types of fluids are pictured and briefly described in four-page bulletin, Bul M-1 — Department M-G, Instrument Div., Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa. Check 4618 opposite last page.



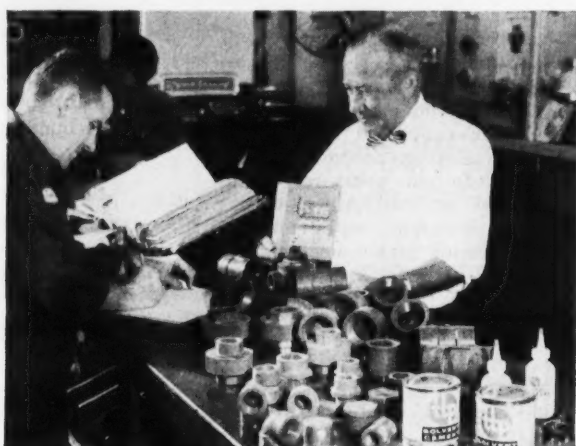
**ELIMINATES GASKET SLIPPING.** To strengthen the grip on gaskets, Tube Turns Plastics has developed a line of flanges with concentric serrated faces. Prevent gasket slippage and help avoid over-stressing of bolts. Available in all sizes.



**EASY TO INSTALL.** More and more engineers are specifying unplasticized PVC piping and ttp solvent cemented fittings because of the simplicity of making joints. Just cut pipe to length, paint on ttp Solvent Cement, and insert into fitting. Of course, where threaded connections are desired, there is a full line of ttp threaded fittings. Complete details in Bulletin 119, free on request.



**FULLY IDENTIFIED.** Every ttp fitting shows you impact grade, size, and quality control code number. This code number in ttp files tells complete history, including source of raw material, tests made on it, production data, and date. Here is further safeguard for your PVC piping when you specify ttp fittings and flanges.



**EASY TO BUY.** Your nearby ttp distributor carries complete stocks of unplasticized PVC fittings, flanges and valves, as well as ttp Solvent Cement and Thread Lubricant. His full line enables you to put all PVC supplies on one order to simplify purchasing. Above: At W. T. Andrew Company, Detroit.

*Leading Manufacturer of Injection Molded Polyvinyl Chloride  
Pipe Fittings, Flanges and Valves*

**TUBE TURNS PLASTICS, INC.**

Dept. CP-4, 2929 Magazine Street • Louisville 11, Kentucky

Check 4616 opposite last page



## Chemical-resistant glass piping helps maintain purity of silicone intermediates

Piping's transparency found to be big help in  
getting Dow Corning's plant on-stream

FRANK McELROY, Associate Editor

With W. C. CUNNINGHAM, Chief Design Engineer  
Dow Corning Corp., Midland, Mich.

**PROBLEM:** Maintaining high purity of silicone intermediates is absolutely necessary if final products are to meet specifications.

One puzzler when Dow Corning designed their new silicone intermediate plant in 1953 was finding construction materials that would stand up under the corrosive conditions at particular stages of the processing.

In this case, not only does corrosion affect the materials of construction, but also could result in product contamination.

**Solution:** After much trial-and-error, Pyrex-brand glass piping was found to withstand the corrosive conditions. Consequently, 3000 linear feet of this piping was installed in the silicone fluid manufacturing unit. Pipe sizes (ID) range from one to six inches.

Pyrex pipe was selected because it appeared to offer the lowest long-range cost for a material which could withstand the corrosive effect.

One "improvement" made on the glass piping as supplied was to paint a strip of electrically conductive paint down one side of the pipe. This prevents any build-up of static electricity, and is a safety precaution. Paint was made in the Dow Corning laboratory.

It is based on a modified silicone resin and filled with graphite for conductivity.

**Results:** Performance has been excellent. Glass pipe has proven to be much stronger and tougher than it appears, there has been very little breakage. Also, because pipe is inert, it does not contribute to any contamination problem which might affect the high purities of the silicone intermediates.

Dow Corning engineers found that they gained an extra dividend by using glass pipe — particularly during the original plant start-up. As piping is transparent, engineers could see troubles in the product immediately and could correct them before they could cause too much difficulty.

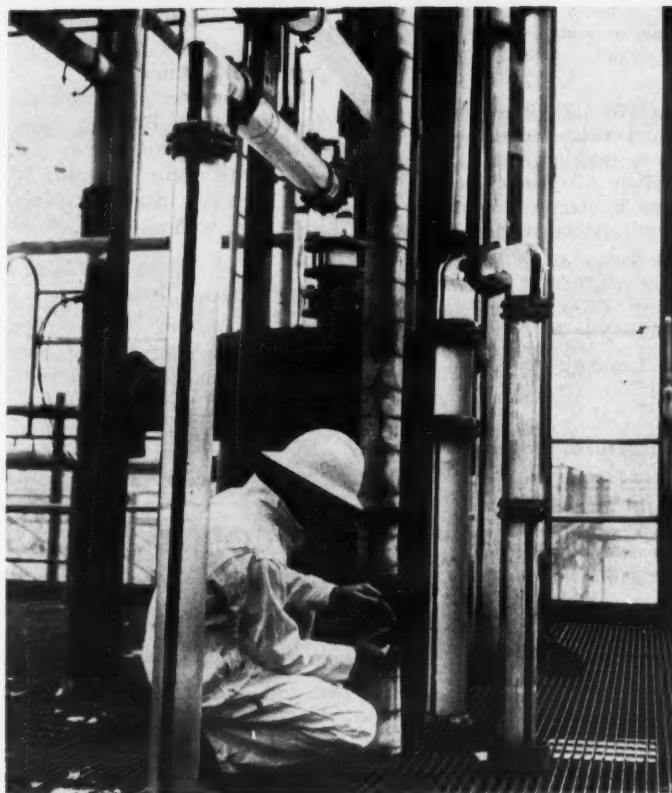
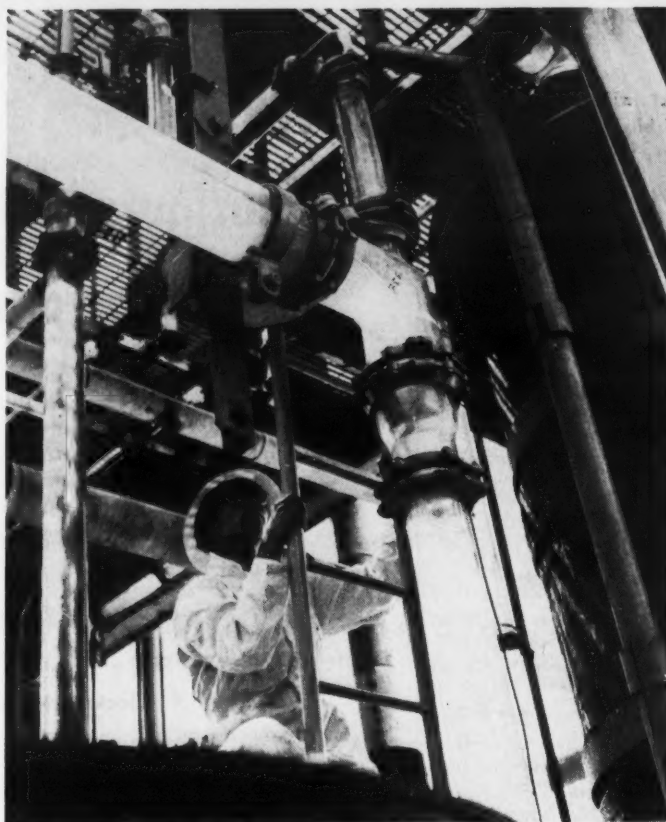
Where necessary to prevent freezing of materials in the pipes, it was no problem to trace and insulate the piping with either steam or electric tracing.

(Pyrex-brand glass pipe is a product of Corning Glass Works, Corning, N. Y.)

Check 4619 opposite last page.

(Formula for electrically conductive paint can be obtained from Dow Corning Corporation; Midland, Mich.)

Check 4620 opposite last page.



Glass pipe has proven to be strong and tough. Black strip seen on one side of pipe is electrically conductive paint which prevents build-up of static electricity, contributes to plant safety

## CORROSION CONTROL

**Compact, all-plastic valve has bubble-tight seal, unusually long life**

No fittings required, valve operates in any position

**Uses:** For handling caustics, acids, and highly corrosive media.

**Features:** With this unit, there is no metal contact with the media being handled. Bubble-tight seal of unusual construction provides valves with long life under extreme



All-plastic solenoid valve will handle caustics, acids, and highly corrosive media

conditions. No fittings are required, and valves will operate in any position.

**Description:** All-plastic solenoid valve is compact, lightweight, and low in price.

(SV-5100 Series of all-plastic valves are product of Valcor Engineering Corp., Carnegie Ave., Kenilworth, N. J.)

Check 4621 opposite last page.

**Sturdy structural material corrosion resistant, lightweight**

Tensile strength of steel, only one-fifth weight

Corrosion-resistant glass-fiber-reinforced polyester laminate fume exhausts are being used successfully in the electroplating department of Curtiss-Wright Corporation, Wood Ridge, N. J. These ducts carry off fumes from preparatory plating processes involving caustics, sulfuric acid, and cyanide, and fumes from the

## Why even chlorinated compounds do not corrode this pipe

Pump boiling HCl through PYREX brand Pipe for 200 years and you'd still find the pipe intact, still trustworthy, still strong, still transparent.

This single fact was enough to convince the engineers at Velsicol Chemical Corporation's Memphis Tennessee plant that PYREX piping is ideal for their chlorinated acids and organics.

It's also a fact that of all the thousands of corrosive chemicals you might pump through PYREX Pipe only hydrofluoric acid and hot alkalis would have any appreciable corrosive effects on the pipe.

### Blocks side reactions

No metal traces can enter your process from PYREX Pipe and the glass itself can never act as a catalyst, so you never get contaminating side reactions.

### Makes processing visible

Transparency is a terrific advantage in piping.

You can see the condition of your product and process at all times.

Your maintenance crew saves time with visual inspections, too. Because of its smooth glass surface, PYREX Pipe seldom allows scale or sludge build-up. But should this occur or should something block this pipe, your men can locate the trouble exactly and determine its nature without tearing out the entire pipeline.

### New bulletin now out

The new PYREX Pipe bulletin tells you something of the long history of this pipe in chemical processing, examines its many advantages over conventional piping, lists sizes and fittings, and offers information on installation. Send the coupon for a copy.



*Corning means research in Glass*

### CORNING GLASS WORKS 34 Crystal Street, Corning, New York

Please send a copy of your NEW PYREX Pipe Bulletin.

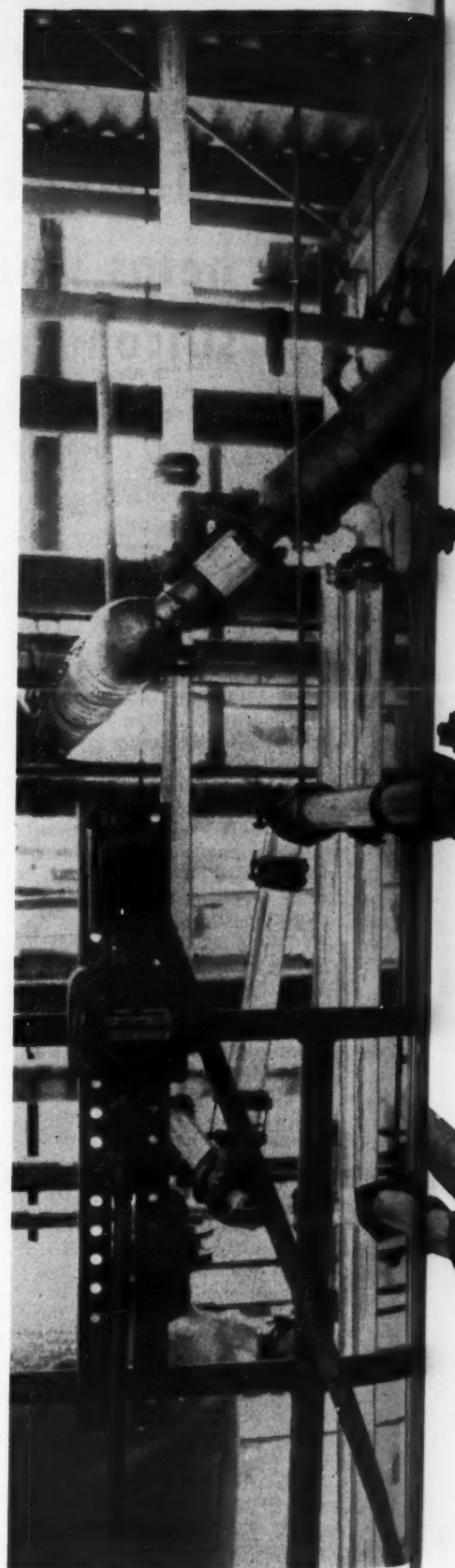
Name.....

Title.....

Company.....

Street.....

City..... Zone..... State.....





More than 2000 feet of PYREX Pipe carry chlorinated acids and organics for the Velsicol Chemical Corporation. Complicated arrangements such as this can be completed in less than half the time ordinarily taken to install metal piping.

plating of cadmium, copper, and bronze parts.

Fabricated in seven sections, each duct is 55' long and approximately 3' in diameter. Joints for assembly were made at the plant. There are tanks in front and in back of each duct. The ducts also serve as hoods with adjustable slotted intakes facing the tanks.

A push-pull ventilating system is used. Air is blown across the tanks and sucked into these slotted intakes. In order to carry off condensate, a 2" flow of water is circulated at the bottom of the ducts.

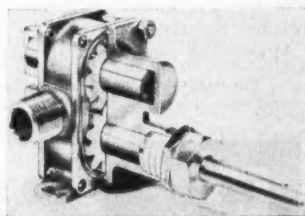
The glass-fiber-reinforced polyester laminate material is also used in the manufacture of tanks, filtrate troughs, and stacks. No molds are needed, and the material can not break or crack.

(Iolyte is a product of Schori Process Div., Ferro-Co Corporation, 8-11 43rd Road, Long Island City 1, N.Y.)

Check 4623 opposite last page.

#### **Rotary gear pump has Teflon gears, bearings, packing**

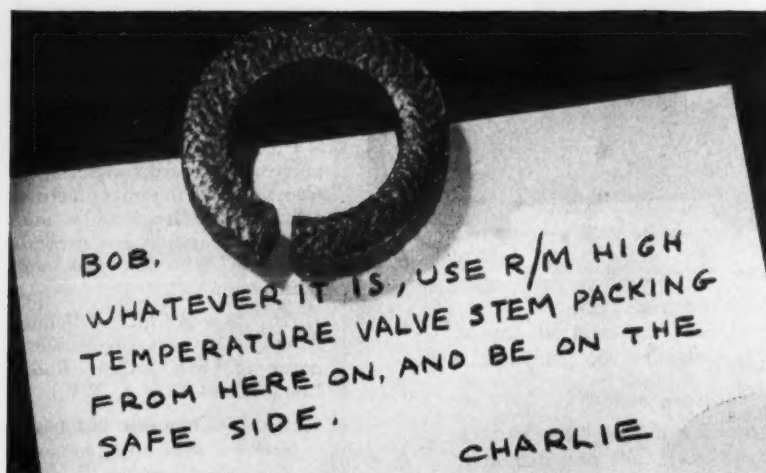
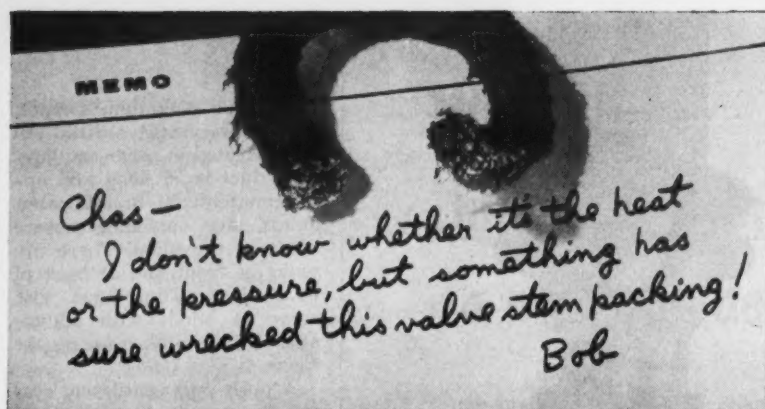
**Uses:** In addition to proportioning and metering applications, pump can be used for general process work in pilot plant and production operations in process industries. Unit is suitable for non-lubricating and corrosive fluids.



With self-lubricating qualities of Teflon bearings, self-priming rotary gear pump will handle non-lubricating fluids

**Features:** According to manufacturer, this is the first time that Teflon gears have been used successfully in rotary pump operation. Pump also

Check 4622 opposite last page



R/M's experienced packing engineers designed this line of packings to help you lick the problems caused by higher temperatures and greater pressures in today's processing lines. R/M High Temperature Valve Stem Packings contain practically no organic materials—and it is these organic materials which cause a lot of your trouble by burning and causing volume loss. Lubricants are ground in during manufacture; so they are thoroughly dispersed all through the packing. And braided asbestos yarn provides you with the maximum performance in pressure resistance.

Among the other packing products

engineered by Raybestos-Manhattan to meet difficult requirements are "Teflon"® and "versi-pak"® "Teflon" packings, because they show no reaction to any known industrial acids or caustics and are noncontaminating, can be of great help to you in a variety of applications. "versi-pak" is a highly engineered nonjacketed packing offering excellent performance with solvents, weak acids, and caustics over a wide range of conditions. Due to the many applications of both these packings, we suggest that you call on R/M's experienced packing engineers for specific recommendations. Their service is at your disposal.

R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—including Vee-Flex,® Vee-Square,® Universal Plastic, and "versi-pak"®; GASKET MATERIALS; "TEFLON" PRODUCTS. SEE YOUR R/M DISTRIBUTOR.  
\*A Du Pont trademark



RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics  
Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings  
Brake Blocks • Clutch Facings • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Check 4624 opposite last page

## CORROSION CONTROL

has internal Teflon bearings and packing.

**Description:** Self-priming rotary gear pump, with  $\frac{3}{4}$ " inlet and outlet ports, has housings of 316 stainless steel or Hastelloy C. Unit is designed to operate at 1750 rpm with fluids of low viscosity, at capacities to 10 gpm and pressures to 100 psi.

Fluids with viscosities to 5000 SSU can be pumped at reduced speeds. Spur gear design permits reversible rotation.

(GearChem is product of Eco Engineering Company, 12 New York Ave., Newark 1, N.J.)

Check 4625 opposite last page.

### Thermal-element corrosion info

Thermal-element selection guide of four pages, lists more than 400 separate corrosive atmospheres into which temperature control elements are often immersed. Easy-to-read chart lists recommended bulb material and other information relating to sustaining life of temperature sensing bulbs in each atmosphere. Bul 110 — The Partlow Corporation, 505 Campion Road, New Hartford, N. Y.

Check 4626 opposite last page.

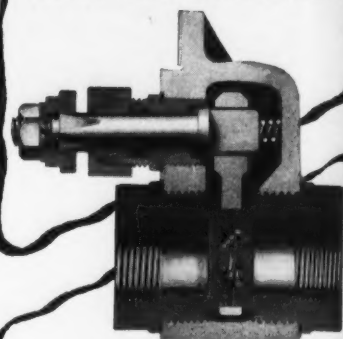
### Stop chlorinator corrosion with tiny tubing of titanium

Completely corrosion-resistant to all solutions in system

Tiny titanium tube, with outer diameter of .063 inches and inner diameter of .026 inches, has teamed with plastics to defeat corrosion in chlorinator for water treatment. Most of the tube is in form of short nipples for connecting flexible, vinyl plastic tube to acrylic blocks. Both plastic and titanium come in constant contact with a wide variety of chemicals, including salt solutions, wet chlorine, and potassium iodide.

Although the amount of titanium tube required for

## FULL-FLOW Okadee VALVES NON-LUBRICATED



## POSITIVE STOP

FOR

- Steam • Air
- Ammonia • CO<sub>2</sub>
- Gasoline • Propane
- Styrene • Butadiene
- Lube Oils • Jet Fuels

Available in Stainless Steel or Steel, Chemically Nickel Coated

You can select Okadee Valves for flow by pipe size—and get full-flow and positive shut-off with virtually any liquids and gases.

Quick-opening, metal-to-metal disc valves and seats require no lubrication—virtually no maintenance for hundreds of thousands of operations . . . Real valve performance and service.

### FACTS AND FIGURES

... on Okadee Valves will be sent promptly on request. Sizes  $\frac{1}{2}$ " to 8"; A.S.A. dimensions; screwed or flanged. Valve seats and discs Stellite or stainless steel; your choice of operators.

• Write for Bulletin CP6



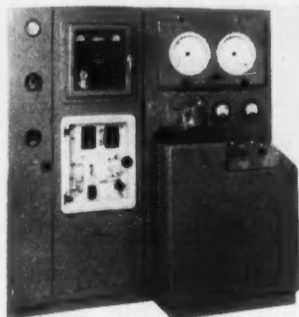
**Okadee COMPANY**  
332 SOUTH MICHIGAN AVENUE  
CHICAGO 4, ILLINOIS

Check 4627 opposite last page

CHEMICAL PROCESSING

## CORROSION CONTROL

each chlorinator is relatively small, it is vital to the satisfactory performance of the equipment. Excellent corrosion resistance prevents clogging and assures unobstructed flow of water through the small bore of tube.



Titanium tube, in the form of short nipples, teams with flexible, vinyl plastic tube to combat corrosion in chlorinator for water treatment

One of the most important reasons for using titanium tube is its exceptionally good resistance to potassium iodide. Titanium was selected for the nipples for its remarkably good resistance to all the corrosive elements encountered.

(Titanium tube is available from Superior Tube Company, Norristown, Pa.)

Check 4628 opposite last page.

(Quality-Quantity Chlorinator is development of Wallace & Tiernan, Inc., Belleville, New Jersey.)

Check 4629 opposite last page.



"Number seven's acting up again, sir."

Inconel alloy

21. Which alloys resist corrosion from hot coal tar fractions the longest?

☐ Inconel alloy? ☐ Metal B?

☐ Metal C? ☐ Metal D? ☐ Metal E?

SPOOL A located in 425°F vapor connection

SPOOL B located in 400°F vapor outlet

## INCO'S in-plant corrosion tests help you answer this kind of multiple-choice question

The alloy samples shown left and right were exposed to 306 days of corrosion.

They were exposed on standard Inco in-plant corrosion test racks in equipment condensing a coal tar fraction containing 5 lbs./1000 gals. of ammonium chloride at approximately 450°F. Nine different types of ferrous and nickel-base alloys were tested.

The story they tell is clear. In this particular equipment, with this particular corrosive, Inconel\* nickel-chromium alloy is the alloy of choice for longest service life.

To the producer concerned, this information was useful in specifying materials for a new condenser. And, by extension, it should prove useful to other makers of coal tar products. But that's not why we're telling you about it.


More important by far! This demonstrates one of the Inco Corrosion Engineering services that help you answer specific questions of material selection.

Nearly always these are multiple-choice questions with, as in this case, thousands of dollars hanging on the answer. What Inco does is to go all-out to get the *factual evidence* you need for decision.

### Need Help With a Corrosion Problem of Your Own?

Very often, the answer to a stubborn problem may be found in our codified files, covering thousands of case histories. Where necessary, we will help you initiate an in-plant corrosion test. Simply write to Inco's Development and Research Division. (If you like, we will send you a Corrosion Data Work Sheet, which makes it easy to outline the problem).

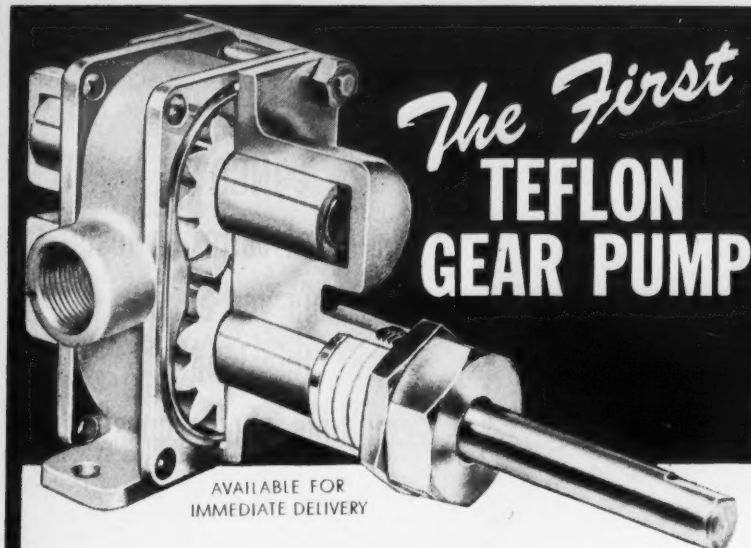
\*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.  
67 Wall Street  New York 5, N. Y.

# INCO NICKEL ALLOYS

Check 4630 opposite last page





AVAILABLE FOR  
IMMEDIATE DELIVERY

## FOR NON-LUBRICATING AND CORROSIVE FLUIDS

*You asked for it...*

and Eco is the only manufacturer who has made it available. The first self-priming rotary gear pump suitable for non-lubricating and corrosive fluids is now available for immediate delivery. The pump, with  $\frac{3}{4}$ " P.T. inlet and outlet ports, features housings of 316 or Carpenter 20 stainless steel, Hastelloy C or nickel, with reinforced Teflon gears and internal Teflon bearings and packing.

*Designated the GearChem\**, this pump is suitable for speeds to 1750 rpm at capacities to 10 gpm and pressures to 100 psi. Viscous media to 5000 SSU can be pumped at reduced speeds.

*The GearChem* created tremendous interest at the recent Chemical Show. In addition to proportioning and metering applications the pump is ideal for general process work in pilot plant and production operations.

Write for prices and complete information.

\* T.M. Applied For

Teflon—duPont trademark

# ECO

*the big name in small pumps*

Market 4-6565

## ENGINEERING CO.

12 NEW YORK AVE.  
NEWARK, N. J.

Check 4631 opposite last page

## CORROSION CONTROL

### Effective corrosion inhibitor at low concentration

**Uses:** As an additive in closed systems where water, glycerine, alcohol, or glycol are used and where corrosion is a problem.

**Features:** Material is reported to be extremely effective corrosion inhibitor at low concentration.

**Description:** Triethylammonium phosphate inhibitor is soluble in water, alcohol, glycols, and glycerines. It is of particular interest as an ingredient of formulations where water, alcohol, glycol, and glycerine in combinations with other materials are stored in tin-plated and steel containers and longer storage life is desirable. It is also of interest as an ingredient of water soluble corrosion inhibitors, especially detergents, emulsion paints, and paint removers.

(Triethylammonium Phosphate 802 is product of Beacon Chemical Industries, Inc., 33 Richdale, Cambridge 40, Massachusetts.)

Check 4632 opposite last page.

### Corrosion-free scrubber

Said to be completely free of harmful effects from corrosive vapors and acids, plastic fume scrubber is detailed in four-page illustrated folder. Application photographs of unit, plus cross-section drawing provide additional information. Fume washer folder — Line-O-Coat Industrial Equipment Company, 1230 South Santa Fe, Compton, Calif.

Check 4633 opposite last page.

### Polyethylene zippers on filter cloth bag resist corrosion

Ride in smooth grooves with no jamming or flake-off

**Uses:** For leaf filters, air ducts, dust bags, and tank covers.

**Features:** Bags are equipped with corrosion-resistant poly-

## FOR CORROSIVE USES **LUZERNE** HARD RUBBER A Complete Line of BUNA-N & NATURAL RUBBER COMPOUNDS

Luzerne Buna-N heat-resisting synthetic hard rubber compounds are recommended for handling materials at temperatures up to 230° F. All the advantages of natural hard rubber plus added qualities of heat and oil resistance.

### HARD RUBBER CUSTOM MOLDED



Specialists for over 50 years in custom molding hard rubber parts and components for chemical processing equipment and installations. Many compounds of both Buna-N heat resistant and natural rubber available for specific services and applications.

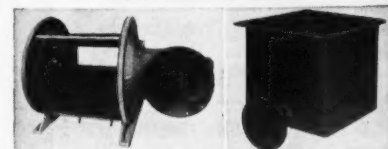
### HARD RUBBER PIPE, FITTINGS AND VALVES

A complete line from  $\frac{1}{4}$ " to 4". Pipe and flanges in larger sizes. Available in heat resistant Buna-N and standard compound.

New improved hard rubber valves, screw stem straightway, screw stem angle and globe valves, threaded or flanged. Plugcocks, straightway cocks, bibcocks, petcocks. Float valves, horizontal and vertical check valves. Available in Buna-N heat resistant compound or standard compound.



### HARD RUBBER LINING



Metal tanks, metal pipe and fittings, special intricate metal parts and castings lined and covered with hard rubber. Special linings available for specific corrosive services.

### HARD RUBBER PUMPS



Improved mechanical seal eliminates usual packing troubles. Capacities to 190 at 90 foot head. Available in Buna-N heat resistant compound or standard compound.

also

### HARD RUBBER BUCKETS, FUNNELS AND UTENSILS, HARD RUBBER SHEET, ROD AND TUBE

Write for complete information  
For ready reference look us up  
in Chemical Engineering Catalog.

### The LUZERNE RUBBER CO.

200 Muirhead Avenue Trenton, N. J.

Sales Representatives  
ALBERT J. COX CO. R. C. FOLTZ CO.  
Chicago, Ill. Houston, Texas

Check 4634 opposite last page

CHEMICAL PROCESSING

## CORROSION CONTROL

ethylene zippers. Zippers ride in smooth grooves with no teeth to snag or collect material that can jam closure or flake off and contaminate the product.

**Description:** Available with any kind of fabric, polyethy-



Lip-type closure of polyethylene zipper for filter cloth bags withstands 80-lb pull

lene zipper is sewn into filter cloth bag with a specially developed stitch that prevents leaking. Zippers can be obtained with lip-type closure which withstands 80-lb pull, or conventional slide fastener.

(Polyethylene-zippered filter cloth bags are available from Filtration Fabrics Div., Filtration Engineers, 155 Oraton St., Newark, N. J.)

Check 4635 opposite last page.

### **Titanium pipe fittings, top corrosion resisters, stable at high temp**

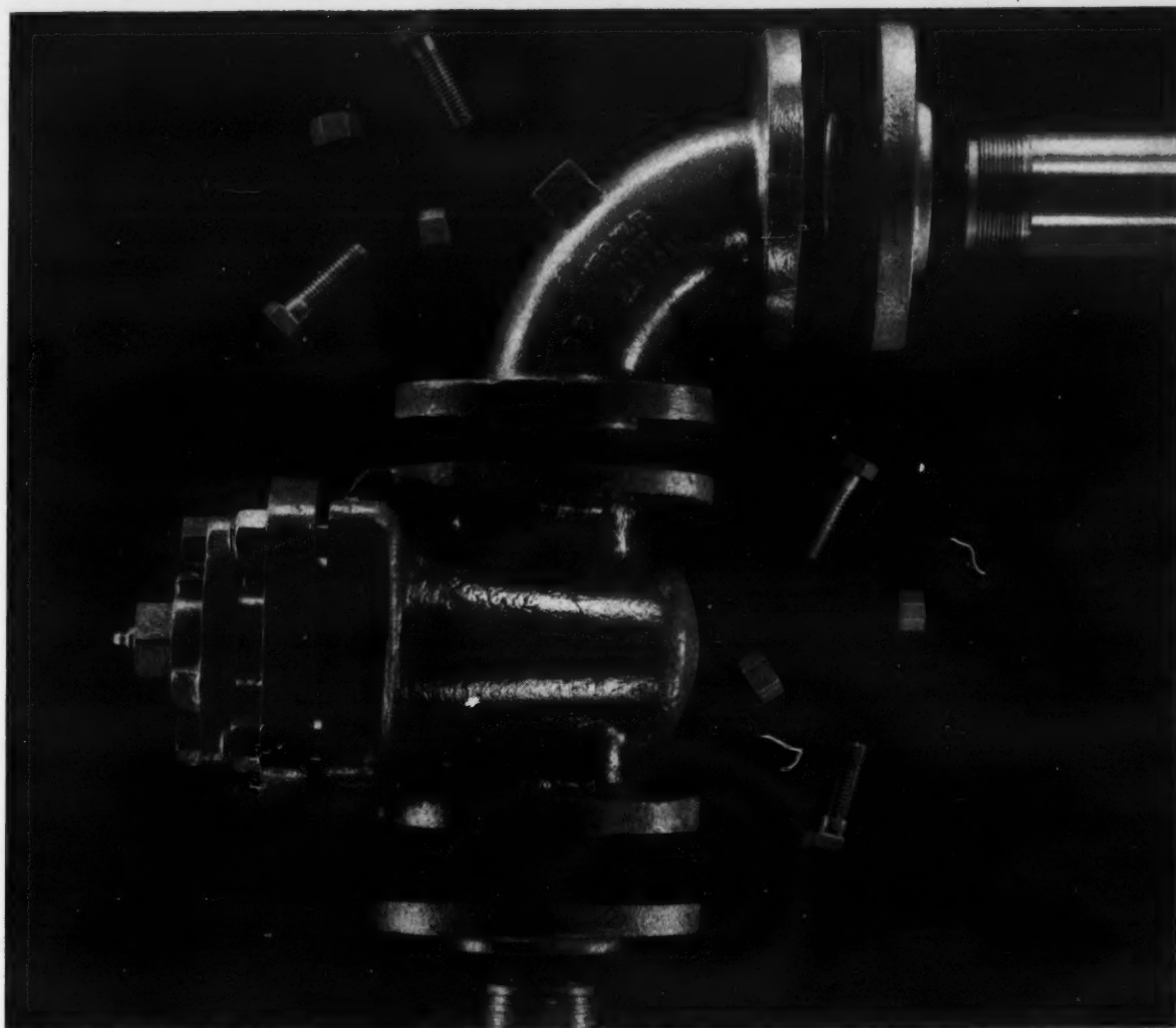
**Uses:** For nuclear pipe systems, and critical service in chemical processing industries.

**Features:** Titanium offers remarkable savings in weight, with greatly increased resistance to corrosion and erosion, plus excellent stability at elevated temperatures. Fittings of titanium are practically impervious to attack by corrosive salts at moderate temperatures.

**Description:** Titanium pipe fittings provide greater latitude in tensile strength, fatigue resistance, and ductility under wide range of conditions.

(Titanium pipe fittings are available from Ladish Company, Cudahy, Wis.)

Check 4636 opposite last page.



## **You can see why Saran lined pipe cuts operating costs**

*These corrosion-resistant pipes, fittings and valves  
are stock items, and they can be fabricated in the field*

The long range economy of Saran lined pipe starts right here—with the immediate availability of pipe, fittings and valves . . . as stock items. There's no waiting . . . no price premium to pay.

And Saran lined pipe can be fabricated in the field. Only conventional hand tools or power equipment are needed to cut and thread it right on the job site.

Saran lined pipe pays off through the years with superior corrosion resistance and strength. When you specify the

new gray Saran lined pipe, valves, pumps and fittings, you'll be able to pipe commonly used acids, alkalies and other corrosive liquids under a wider temperature range.

You can plan a *complete* corrosion-free pipe system with Saran lined pipe, valves, pumps and fittings. They're available for systems operating from full vacuum up to 300 psi and temperatures from -20° F to 200° F. Send the coupon today for further information. And be sure to ask about Saraloy® 898 tank lining, too. THE DOW CHEMICAL COMPANY, Midland, Michigan.

SARAN LINED PIPE COMPANY  
DEPT. 2002B  
2415 BURDETTE AVENUE  
FERNDALE 20, MICHIGAN

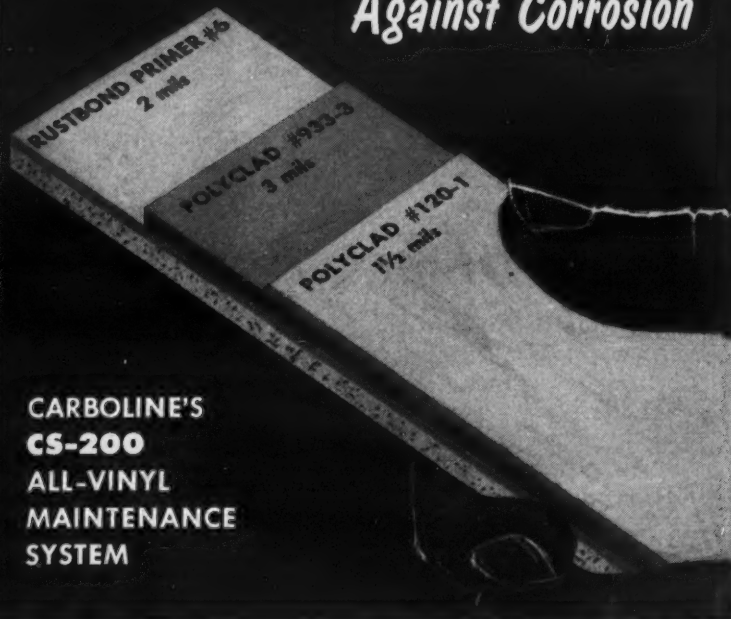
Please send me information on: ☐ Saran lined pipe, fittings and valves ☐ Saran lined centrifugal pumps ☐ Saraloy 898 chemical resistant sheeting  
Name \_\_\_\_\_ Title \_\_\_\_\_ Company \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_

**YOU CAN DEPEND ON**

**DOW**

Check 4637 opposite last page

## 3 LINES OF DEFENSE Against Corrosion



**CARBOLINE'S  
CS-200  
ALL-VINYL  
MAINTENANCE  
SYSTEM**

For general maintenance work, corrosion authorities agree that 3 coats at 5 mils minimum thickness are essential for good protection and economy. Three coats, including a corrosion resistant primer, tend to eliminate porosities often found in heavy-thickness single coat systems.

Carboline's all-vinyl maintenance system has been service-proven to exceed these requirements and assure better chemical resistance to acids, alkalies, water and weathering.

### The Carboline CS-200 system (6 1/2-7 mils):

- Rustbond Primer #6** good edge coverage, reduces undercutting, bonds tightly to wire brushed steel. Dries fast, speeds application.
- Polyclad #933-3** an economical, high build intermediate coat formulated for better resistance to penetration than heavily filled vinyl mastics.
- Polyclad #120-1** a tight seal coat with outstanding resistance to chemicals and weathering.

Use Carboline's Engineering Approach—compare solids content, coverage per gallon, mil feet per gallon, mil thickness per coat, resistance to corrosive, estimated recoating cycles, **COST PER SQUARE FOOT PER YEAR OF SERVICE**. It's the soundest method to determine the most effective, economical corrosion protection.

WRITE TODAY for bulletins and specifications on Carboline's CS-200 All-Vinyl Maintenance System. Also, request our precision wet film thickness gauge—no obligation.

**carboline**  
C O M P A N Y

32-B Hanley Industrial Ct.  
St. Louis 17, Mo.

Manufacturers of  
**PHENOLINES and  
CARBOMASTICS**

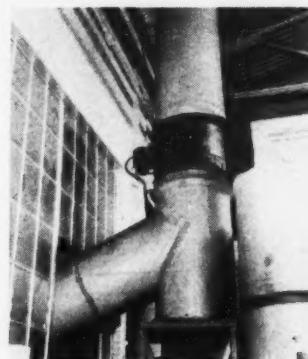
## CORROSION CONTROL

**Remove corrosive fumes  
from pickling bath  
with plastic hood**

After two years service, no sign of deterioration

Fumes from a hydrofluoric-nitric pickling bath at the Wallingford Steel Company, Wallingford, Connecticut, have been successfully removed by reinforced polyester fume hood 40' long and 5' wide for over two years without any signs of deterioration during that period of time.

This continuous pickling operation of stainless steel strip



Reinforced-polyester fume hood 40' long and 5' wide has removed fumes from hydrofluoric-nitric pickling bath for over two years without deterioration

in chrome nickel series and straight chrome series is used for all stainless steels which are purchased by Wallingford Steel as sheet and subsequently rolled into strip for production of welded steel tubing. The pickle bath consists of a solution of four percent hydrofluoric acid and 12 to 15 percent nitric acid at a temperature of 150°F. Fumes from this bath are extremely corrosive and could present a real health problem.

The polyester glass-reinforced fume duct has been in service over two years without need for maintenance and with no sign of wear or corrosion. The hood is lined with Dynel-reinforced polyester. The Dynel reinforcing used in the lining stands up against possible attack by hydrofluoric acid which will attack glass reinforcing of polyester when

## Eliminate "CHEWED UP" SHAFTS with **CHEMPRO** **NEW** **SPRAYED CERAMIC SERVICE**



Chempro's new extremely hard, chemically inert ceramic coatings applied to shafts and shaft sleeves eliminate the costly failure of "chewed up" or "scored" shafts and sleeves. Sprayed ceramic surfaces are highly resistant to abrasion, erosion and fretting corrosion under even the most difficult slurry service. They also give ideal protection against shaft wear under high packing gland pressures.

Pump down-time due to shaft or sleeve failure has been drastically reduced in every installation in which Chempro's sprayed ceramic surfacing has been used.

Write for new Chempro Bulletin CP28 for ordering information.

 **CHEMICAL & POWER  
PRODUCTS, Inc.**  
9 Broadway, New York 4, N. Y.

Check 4638 opposite last page

Check 4639 opposite last page  
**CHEMICAL PROCESSING**



## CORROSION CONTROL

subjected to long exposure.

(Reinforced polyester fume hoods and stacks are product of Haveg Corporation, 900 Greenbank Rd., Wilmington 8, Delaware.)

Check 4640 opposite last page.

### Protective coating data

Basic characteristics of plastic-type protective coating are described in 16-page bulletin which includes data on application, drying times, coverage, and surface preparation. Bul MS-57 — Mono-Seal Products, 44 Garden St., Everett 49, Mass.

Check 4641 opposite last page.

### Fluorocarbons and vinyls combined in tube

Withstands severe corrosives, resists high pressure

Recently developed plastic tubing consists of a highly resistant inner core, over-sheathed and bonded to a high-temperature, high-strength vinyl. Tubing provides a practical combination of the chemical-resistant properties of the fluorocarbons and the physical properties of the vinyls.

Tubing is unaffected by all acids except white fuming nitric and concentrated chromic, by all alkalis with the possible exception of ammonia gas. It is resistant to all alcohols and to both aromatic and aliphatic hydrocarbons. Product shows no loss of its chemical-resistant properties at temperatures in excess of 300°F.

Another interesting property of material is its ability to withstand high pressures without braid reinforcement. Safe working pressures are up as high as 2600 psi, depending on size of tubing and temperature. Complete vacuum can be withstood at temperatures as high as 300°F.

(Fluran B-4100 tube is product of U. S. Stoneware Co., Akron 9, Ohio.)

Check 4642 opposite last page.

Fig. 2108—Monel or Nickel "Y" Valve for 150 pounds W.P. Outside screw rising stem and yoke. Screwed ends. Flanged end or socket welding end valves can be supplied.

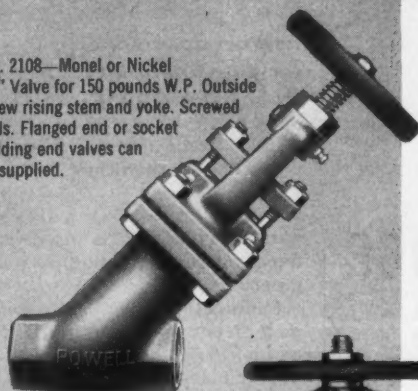


Fig. 2453 SG—Large size O.S. & Y. Gate Valve for 150 pounds W.P. Solid wedge disc. Can also be furnished with split wedge disc. Dimensions conform to latest standards.

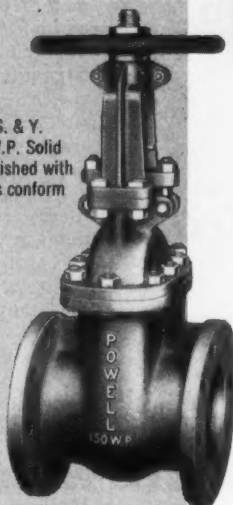


Fig. 1836—Monel Metal Fig. 1839—Nickel Small Union Bonnet Globe Valve for 200 pounds W.P. Available with screwed, flanged or welding ends; also in angle pattern.

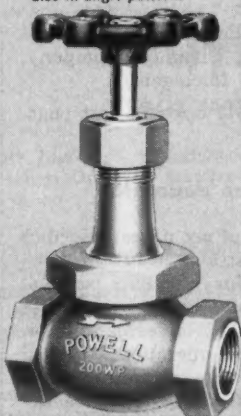


Fig. 1843—Monel Metal. Fig. 1845—Nickel. Small size Check Valve for 200 pounds W.P. Screwed-in cap. Has straightway flow area through valve body when disc is in wide open position. Can also be supplied with flanged or socket weld ends.

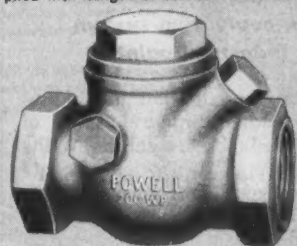


Fig. 2493—Bolted flanged bonnet Gate Valve for 150 pounds W.P. Outside screw stem rises through revolving bushing in upper yoke. Interchangeable solid or split wedge discs. Screwed or socket weld end valves also available.

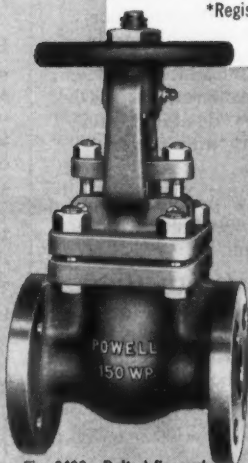


Fig. 1828—Monel Metal Fig. 1830—Nickel Inside screw rising stem Gate Valve for 200 pounds W.P. Accurately guided solid wedge disc. Also available with flanged or socket weld ends.

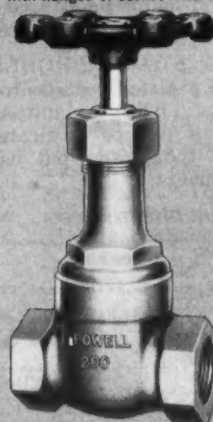
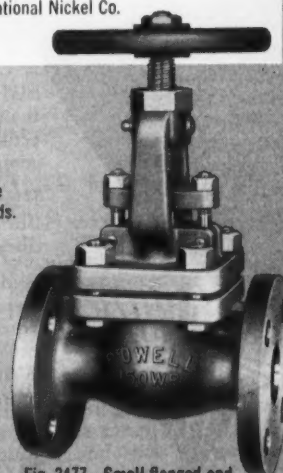


Fig. 2477—Small flanged end, outside screw rising stem and yoke Globe Valve for 150 pounds W.P. Bolted flanged bonnet. Can be furnished with screwed or socket weld ends. Angle Valves available.



# AGAIN AVAILABLE!

## POWELL NICKEL and MONEL\* VALVES

Now that restrictions have been lifted on the manufacture of Nickel and Nickel Alloys, we have produced a wide line of NICKEL and MONEL\* METAL VALVES. All are ready for immediate delivery!

When your flow control requirements call for Nickel or Monel\* Metal Valves your local Powell Valve Distributor is the man to see. There's one located in all principal cities. Or write to us for complete information.

**THE WM. POWELL COMPANY**  
Cincinnati 22, Ohio  
*dependable valves since 1846*

\*Registered Trade Name of The International Nickel Co.

Check 4643 opposite last page

# NOW!

a new

## CORROSION-PROOF GAS SCRUBBING TOWER

fabricated  
from  
**DURACOR**  
Reinforced  
Plastics

**PROBLEM:** A large zirconium producer needed a material to withstand corrosive gases entering scrubbing towers at +300° F.

**SOLUTION:** Working from customer specifications, Ceilcote engineers designed and built this unit — base, body and tower — completely from DURACOR.

**RESULT:** DURACOR now provides long life and maintenance-free operation in handling HCl gases and chlorine.

**WHAT'S YOUR PROBLEM?** DURACOR resists practically any corrosive gas, fume or liquid... offers unlimited applications because it can be fabricated to any shape. Write today and tell us about your requirements.

SEE OUR INSERT IN CEC

8017-CC

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Please send me free of charge your  
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DURACOR...  
Tensile Strength:  
11-15,000 PSI  
Flexural Strength:  
20-30,000 PSI  
Resists many  
acids, alkalis  
and solvents.



THE  
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\*Birmingham, Alabama • Buffalo, New York • \*Chicago, Illinois • \*Cleveland, Ohio • \*Detroit, Michigan • Evansville, Indiana • \*Houston, Texas • Kansas City, Missouri • Los Angeles, California • \*San Francisco, California • Seattle, Washington • Springfield, Massachusetts.  
\*Warehousing

Check 4644 opposite last page

## CORROSION CONTROL

Improved saran lining  
for pipe operations  
from -0 to 200°F

50% reduction in thermal  
expansion coefficient

**Uses:** For pipe, valves, pumps, and fittings used in handling corrosive liquids and gases.

**Features:** Operations from well below zero up to 200°F can be handled by lining without damage. Because it has 50 percent reduction in its coefficient of thermal expansion, lining expands and contracts to approximately same degree as steel casing.

**Description:** Improved saran lining was field-tested for 18 months under extreme variations in temperature. Besides withstanding temperature variations, lining showed improved impact resistance. Standard stock sizes of pipe, valves, pumps, and fittings with improved lining are available.

(Saran lining is product of The Dow Chemical Company, Midland, Michigan.)

Check 4645 opposite last page.

### Tray-type deaerator

Bulletin of six pages describes and illustrates tray-type deaerator for effective removal of corrosive gases from boiler feed water. Information on cycle of operation, typical storage range, as well as table of standard tray-type deaerator is included. Bul 28B8853 — Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

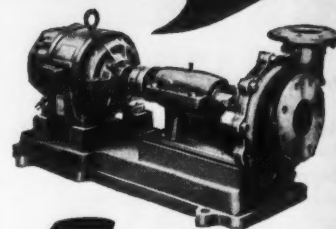
Check 4646 opposite last page.

Save money, man hours  
thru evaluation system  
for industrial paints

Paint evaluation for industry is an integral part of maintenance research. Without proper evaluation of coatings, intelligent recommendations for their use cannot be made.

Many coatings are ordered with no thought as to whether they have been thoroughly

Custom-built for  
**EFFICIENT  
DEPENDABLE  
SERVICE**



*Frederick*  
**SSV PUMPS**

Enclosed Impeller  
and Open Impeller Types

You're sure of maximum service and output with minimum maintenance or production down time with Frederick SSV Centrifugal Pumps because each pump is custom-made to fit your particular operation—whatever the consistency or type of liquid you're moving.

### SSV PUMP FEATURES

- Pump sizes from 1" to 4" discharge openings.
- Pump capacities from 50 up to 700 U.S. GPM.
- Heads from 30 up to 220 feet.
- Pumps speeds can be varied to suit the driving media and operating conditions.

### CONSTRUCTION ADVANTAGES

Pump casings are vertically split for easy accessibility. Mounted on a swivel to permit placing discharge in any desirable position. Pump openings, both suction and discharge, flanged to permit easier connection and disconnecting to joints. One-piece impellers, securely attached to shaft by stout key and lock nut, or threaded, give long service. Pump bearings mounted in sturdy frame horizontally split for easier accessibility. Extra long stuffing box provides for oversize stuffing. Mechanical seal also available for minimum leakage. Pump coupling flexible for direct connection to drivers or can be arranged for belt drive. Pump speed, pump openings, etc. are selected to suit your particular requirements.

Write for Bulletin No. 107



FREDERICK IRON AND STEEL, INC.  
FREDERICK Est. 1890 MARYLAND

Check 4647 opposite last page  
CHEMICAL PROCESSING



## CORROSION CONTROL

tested for their particular application needs and operating conditions. Often, the result is needless waste, both in money and in man hours.

In order to eliminate this waste, manufacturer has made available items of its paint evaluation system such as panels, record systems, forms, and other supplies. These have been developed and used by the manufacturer, and proven to be extremely reliable in all details.

(Information on paint evaluation system may be obtained from Kenneth Tator Associates, 2020 Montour St., Coraopolis, Pa.)

Check 4648 opposite last page.

### Guard against breakdown of acid plant precipitator by lead protection

**Uses:** For recovering valuable acid and preventing air pollution.

**Features:** To prevent breakdown of equipment, which could cause serious damage to other plant equipment in process, unit has lead protection on all interior portions exposed either to gas itself or to precipitate.

**Description:** Electrostatic precipitator of acid mist type is designed to handle 8400 cfm of gas generated by decomposition of alkylation acid.

(Electrostatic precipitator is product of Metal Products Div., Koppers Company, Inc., Koppers Bldg., Pittsburgh 19, Pennsylvania.)

Check 4649 opposite last page.

### Heat transfer data

Heat exchangers, immersion heaters, and jet agitators constructed of graphite are described in four-page bulletin. Flow rates and effective heat transfer areas for standard multiple-tube and concentric-tube heat exchangers of various sizes are listed. Bul 156 — Heil Process Equipment Corporation, 12901 Elmwood Ave., Cleveland 11, Ohio.

Check 4650 opposite last page.



BEN BUTLER (right), West Coast Production Manager, Borden Company Chemical Division. Left, Bernard Egan, Alaskan Copper & Brass Co., Cooper Alloy distributor for the Pacific Northwest.

## BUTLER OF BORDEN CHEMICAL tells why he buys COOPER ALLOY stainless steel valves

**Q. Mr. Butler, why does Borden Company Chemical Division require stainless steel valves?**

**A.** In the manufacture of formaldehyde, its derivative resins, and corresponding industrial adhesives only stainless steel can meet our rigid requirements for corrosion, contamination and heat resistance.

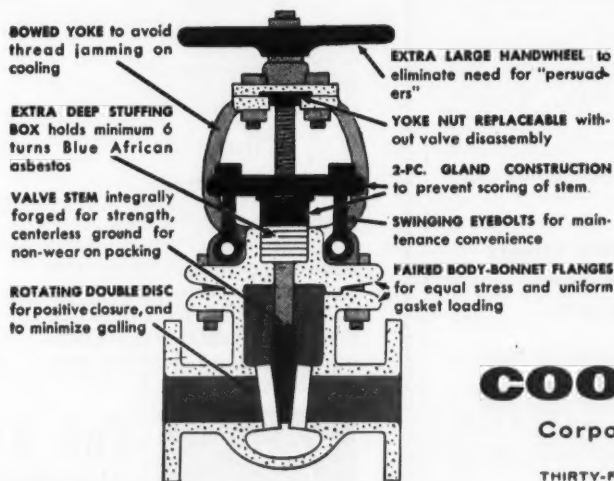
**Q. What do you consider the most important factor in purchasing valves?**

**A.** The truest measure of a valve is its operating performance. We have never received a complaint on Cooper Alloy valves from our engineers or operating personnel. The extra-large handwheel and unique valve design afford easy operation

with positive opening and closing, minimizing maintenance and down time.

**Q. What other factors count in choice of valve supplier?**

**A.** Service. The large and complete Cooper Alloy stock at Alaskan Copper affords immediate delivery on stainless steel valves and fittings, as well as pipe. That's a big reason why we buy Cooper Alloy!



### A VALVE DESIGNED FOR STAINLESS!

The Cooper Alloy valve is not an adaptation of earlier brass and iron patterns. Cooper Alloy, with over 35 years of experience in handling stainless steel, created a valve designed to be cast in stainless! Check the Special Design Features shown at left.

As the little CA man below is saying: "You can tell a Cooper Alloy Valve as far as you can see it!" Write today for your copy of our folder "Design Factors In Stainless Steel Valves." The Cooper Alloy distributor near you will be glad to show you the complete line of Cooper Alloy valves and fittings, and their advantages. He can serve you promptly from local stocks.

**COOPER & ALLOY**

Corporation • Hillside, New Jersey  
VALVE & FITTING DIVISION

THIRTY-FIVE YEARS OF STAINLESS STEEL PIONEERING

Check 4651 opposite last page





If you formulate  
**ACID CLEANERS**  
you can use  
this label . . .

The manufacturer of an  
**ACID CLEANER** who displays this label on his product indicates he is using the finest Corrosion Inhibitor available.

For complete information on O'B-HIBIT and the distributors in your area, write:



O'B-HIBIT  
P. O. Box 72  
Coldwell, N. J.

Gentlemen:  
Please send complete information on O'B-HIBIT Corrosion Inhibitor.

Name .....

Address .....

Check 4652 opposite last page

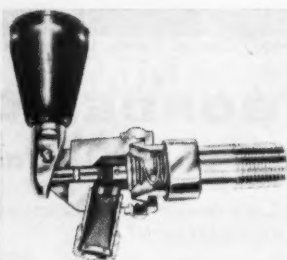
## CORROSION CONTROL

**Stainless steel faucet for corrosive liquids has Teflon seals**

**Uses:** For dispensing corrosive and flammable fluids.

**Features:** Stainless steel unit has Teflon O-ring seals. Both fluid- and vapor-tight seals are provided over wide temperature range.

**Description:** Sealing in stainless steel dispensing faucet is accomplished by internal-system pressure which eliminates seizure problems that are prevalent in mechanically pre-loaded dispensing equipment. In tests on flammable solvents, anti-flash screen of faucets used on storage drums successfully prevented propagation of any flames entering drum through spout. Faucet is self-closing when not held open manually. Teflon seals insure positive shut-off with



Stainless steel, corrosion-resistant dispensing faucet has Teflon O-ring seals

no after-drip. Guard prevents unit from being jammed in open position.

(Stainless steel dispensing faucet is available from Eco Engineering Div., Economy Faucet Company, 12 New York Ave., Newark 1, N. J.)

Check 4653 opposite last page.

**Field-attachable fittings won't vibrate loose, have positive seal**

Easily assembled in field — no special tools

**Uses:** As re-usable fitting with high-temperature Teflon hose.

**Features:** Triple locking device prevents vibrations from

# BISONITE'S #957 COATING SYSTEM

*for Superior Corrosion Control*

## COATINGS

### CORROSION REPORT

Material

Acid  
Alkali  
Solvent

### BISONITE "957" Resistance

Excellent Good Poor



To prevent Corrosion by and Contamination of  
Food Products Heavy Chemicals Beverages  
Oils and Greases Hot Water  
Salts Solvents

A thermally cured coating that resists acids, solvents and alkalis

- Permanent adhesion.
- Withstands 72% caustic at 130°C. for prolonged periods.
- Strong • Tough • Flexible.
- Glazed glasslike surface.
- Greater thickness in fewer coats. Reduces cost.
- A NEW Advance in the field of applied coatings.
- Applied by qualified applicators across the nation.



Solves many problems of chemical corrosion. For lining tanks, tank cars, pipes, food containers, storage bins, fans, ducts, hoods, etc. at moderate cost. Made by a company specializing in corrosion resistant coatings. Not a side line. BISONITE products in many cases have corrected conditions when other coatings have failed. Write for descriptive literature. Our nearest approved applicator will be glad to give your coating problems immediate attention.

**BISONITE COMPANY, Inc.**

2246 Military Road  
Buffalo 17, N.Y.

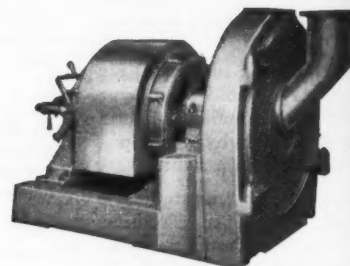
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## DO YOU KNOW?

**BAUER**  
Single Disc Attrition  
Mills are Used for

- GRANULATING
- FLUFFING
- BLENDING
- TEXTURIZING
- MIXING
- FIBERIZING
- GRINDING

If you have a processing problem, we invite you to take advantage of our Research Laboratory. We maintain full-sized machines for evaluating operational data and helping our customers develop new processes.



Available in 7 sizes,  
8" to 44" diameter.  
Ask for Bulletins S-2, A-7, P-13.

In addition to single and double revolving disc attrition mills, we offer hammer mills, breakers, crushers, laboratory mills, cleaners, classifiers, specific gravity separators, and related machines. The full line is illustrated and described in our Catalog No. 52. A copy is yours upon request.



**THE BAUER BROS. CO.**  
1728 SHERIDAN AVE. • SPRINGFIELD, OHIO

Established 1878

Check 4655 opposite last page

CHEMICAL PROCESSING

# GOODALL Rubber and Neoprene CLOTHING and FOOTWEAR

**SAFE • COMFORTABLE  
DURABLE... for Every  
Job in Plant and  
Laboratory**

Goodall Clothing and Footwear meet every plant and laboratory need with items of long-established quality and value. Practical design, selected materials and careful manufacture assure the utmost in protection, comfort and durability.

## COATS • APRONS • OVERALLS

Available in rubber, rubber latex and neoprene latex, in a wide range of styles and sizes. Carefully tailored to provide fine appearance, maximum comfort and long wear.



## "GOODSEAL"

### All-Purpose GLOVES

Made of special compound that is impervious to the actions of oil, acids, alkalis, animal fats and most other solids and solutions. Smooth, flexible, easy to wear. Highly resistant to snagging and puncturing. Extra-grip finish on finger tips.



## BOOTS • SHOES • RUBBERS

Rubber and Neoprene Boots and Lace Work Shoes, with or without "Toe-Saver"® Safety Toe. Slip-resistant soles. White Dairy Boots, 10" high. Best quality Work Rubbers, net lined.



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Contact Our Nearest Branch for Details and Prices.

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AND OTHER INDUSTRIAL RUBBER PRODUCTS

# GOODALL Rubber Company

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.  
BRANCHES AND DISTRIBUTORS THROUGHOUT THE UNITED STATES.  
IN CANADA: GOODALL RUBBER CO. OF CANADA LTD., TORONTO.

Check 4656 opposite last page

APRIL 1958

# FANSTEEL Corrosionomics

REGISTERED U. S. PATENT OFFICE  
A JOURNAL OF USEFUL INFORMATION FOR THE SOLUTION OF CORROSION PROBLEMS

## IMMERSION HEATER USES ACIDPROOF TANTALUM SHEATH

The combination of tantalum, Teflon\* and a high watts density Firerod\*\* cartridge provides an acidproof heater that proves ideal for a variety of chemical processing jobs where hot acids must be used.

### High Heating Efficiency, Acidproof Construction

The electric immersion heater shown here consists of lead wires passing through a Teflon-covered copper tube and a 2000-watt, 230-volt Watlow heating element sheathed by a 6 3/8" tantalum tube. Teflon and tantalum are swaged together to make a leak-proof connection. The cartridge itself features a design which provides a low temperature differential between the resistance wire and the tantalum sheath. It will heat one gallon of tap water from 8°C to 96°C in 15 minutes. A gallon of 62% H<sub>2</sub>SO<sub>4</sub> solution can be heated from 17°C to 142°C in 14 minutes.

### Long Life in Chemical Milling Service

Chemical Contour Corporation, Downey, Calif., has used three of these tantalum immersion heaters in chemical milling service since November 13, 1957.

They are used in 55 gallon drum-size tanks to heat acid solutions for dissolving stainless steel. The acid is heated from room temperature to 160°F in approximately 1 1/4 hours, and is held to within ±5°F by intermittent heater operation.

President James H. Langworthysays: "The tantalum sheathed heaters are extremely versatile. They are easy to move, require little or no support, are

\*Mfg. and copyrighted by Watlow Electric Mfg. Co., St. Louis, Mo.

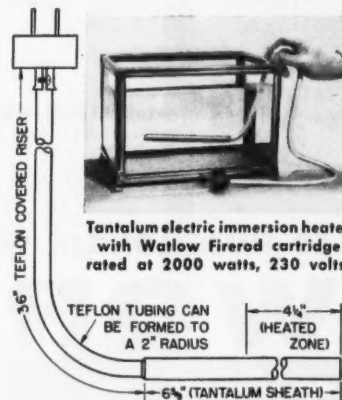
\*\*Trade Name, E. I. duPont de Nemours & Co., Inc.

easily bent to convenient shapes, are not fragile and can heat acid solutions at a great variety of depths."

### Closely Regulated Electroplating Baths

Another company uses this heater in a Watts nickel plating bath to heat this acidic solution and to hold it at 130°F. The fact that tantalum is inert to the solution virtually eliminates the metal ion contamination problem. After the first seven months of service, the heater saw 3500 hours of service with no sign of impaired performance.

Ask for our bulletin on this versatile tantalum electric heater. Tantalum corrosion data are also shown on page 748 of Chemical Engineering Catalog.



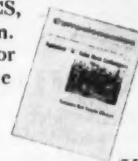
Dimensions are shown in drawing. Teflon covered riser can be easily bent to a two-inch (min.) radius for desired positioning.

### Free Tantalum Test Kit

A corrosion test kit, available without charge to research technicians, if requested on your letterhead; contains both tantalum sheet and wire.

### Free Technical Information

The above condensation is typical of the articles which appear in CORROSIONOMICS, a Fansteel publication. Mail us your name for inclusion on our free mailing list.



For further data on the above, write:

G583A

## FANSTEEL METALLURGICAL CORPORATION

CHEMICAL EQUIPMENT DIVISION

NORTH CHICAGO, ILLINOIS, U. S. A.

Check 4657 opposite last page

even  
acid  
can't  
harm



## VALDURA VAL-CHEM CHEMICAL RESISTANT COATINGS

Acid may never be poured on your storage tanks but acid fumes—as well as other harmful chemicals—can damage costly machinery, tanks and other equipment unless they're protected with the right Valdura Chemical Resistant Coating.



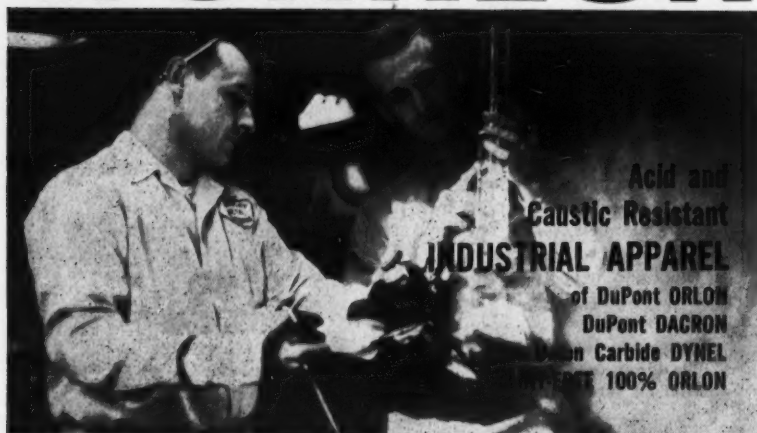
**VALDURA HEAVY-DUTY PAINT DIVISION**  
AMERICAN-MARIETTA CO. • 101 E. Ontario St. • Chicago 11, Ill.

Check 4658 opposite last page

**FREE** literature on Valdura Val-Chem #650 series (made with chlorinated rubber), #630 series (made with Epon resin), Val-Chem #690 series (made with modified epoxy resin), Val-Chem #640 series (made with vinyl resin) and Val-Chem #660 series, latest type of urethane coating that holds up where all others have failed. Request on company letterhead.

50 TIMES LONGER WEAR with

# WORKLON



Acid and  
Caustic Resistant  
**INDUSTRIAL APPAREL**  
of DuPont ORLON  
DuPont DACRON  
Carbon Carbide DYNEL  
100% ORLON

**SAVINGS UP TO 93%**

Worklon work clothes resist punishing acids and chemicals . . . actually outlast cotton and wool garments by 50 to 1 as proved in on-the-job tests under corrosive chemical conditions. No need for constant replacement of acid-damaged uniforms! Worklon apparel wears far longer, saves you as much as 93% in work clothes costs! Want proof? See Worklon's new 1958 catalog and information book. It's yours for the asking!

**SEND FOR NEW FREE CATALOG**

WORKLON, INC., Dept. CP-48 253 W. 28 St., N. Y., N. Y.

Gentlemen:

Please send me the new Worklon Catalog FREE!

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ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

**WORKLON**

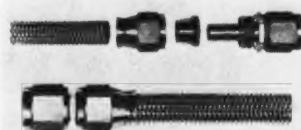
253 W. 28 St. N. Y. N. Y.

Check 4659 opposite last page

## CORROSION CONTROL

jarring fitting loose. Design provides positive seal preventing any leaks. Fittings can be easily assembled in field without use of special tools or skills.

**Description:** Re-usable fitting has left-hand assembly threads to prevent accidental



Re-usable fittings can be assembled in field without use of special tools or skills

loosening during installation. Flared skirt on socket makes assembly easy yet protects hose from concentrated stresses. Critical parts are hardened to preserve extra safety factors so that intricate and expensive fittings can be safely used again and again.

(Seal-Lock fittings are a product of Resistoflex Corp., Roseland, N. J.)

Check 4660 opposite last page.

### All-plastic gate valve

Booklet of four pages contains essential and usable data about all-plastic gate valve for conveying corrosive and abrasive liquids in lines that must be chemically free of contamination. Drawings show advantages, and tables list dimensions and psi and temperature limitations. Cat 42.0 — Vanton Pump & Equipment Corporation, 201 Sweetland Ave., Hillside, N. J.

Check 4661 opposite last page.

### Pipe to be cost-cutter in handling corrosives

Also useful to petrochemical and nuclear industries

A recent development has made available a new highly corrosion-resistant pipe made of cost-cutting integrally bonded clad steel in diameters as small as four inches. The

**PUMPS**  
of NICKEL, MONEL  
or CHROME-NICKEL  
ALLOYS but only for the  
WETTED END  
write **TABER**



Because at Taber, your PUMP NEEDS will receive the personal attention of highly specialized pump engineers . . . your objectives are most likely to be realized. Many of the oldest, largest and most respected producers in the chemical industry have and are using both Taber service and pumps.

NOTE, the vertical design pump permits locating stuffing box above and out of liquid level . . . nothing to leak. Horizontal Pumps, write for Bulletin C-355. Vertical, Bulletin V-837.

**TABER  
PUMP CO.**

Est. 1859  
291 ELM ST.  
BUFFALO 3, N. Y.

**TABER**

Check 4662 opposite last page  
CHEMICAL PROCESSING



## CORROSION CONTROL

inside surface layer of the small-diameter pipe is a layer of solid stainless steel, completely and permanently bonded to a heavier outer layer of carbon steel.

This development was made possible by new economical techniques by which clad pipe can be fabricated and joined while still preserving the integrity of the vital inner layer of stainless. The new pipe will give all the benefits of solid stainless at a cost below that of comparable solid stainless.

In addition to its value in handling such corrosive materials as nitric acid, clad pipe is expected to be of great importance to the petrochemical, petroleum, and nuclear industries.

(Stainless-clad pipe is development of Lukens Steel Company, Coatsville, Pa., and Youngstown Welding & Engineering Co., 3800 Oakwood Ave., Youngstown 9, Ohio.)

Check 4663 opposite last page.

### Fume washers

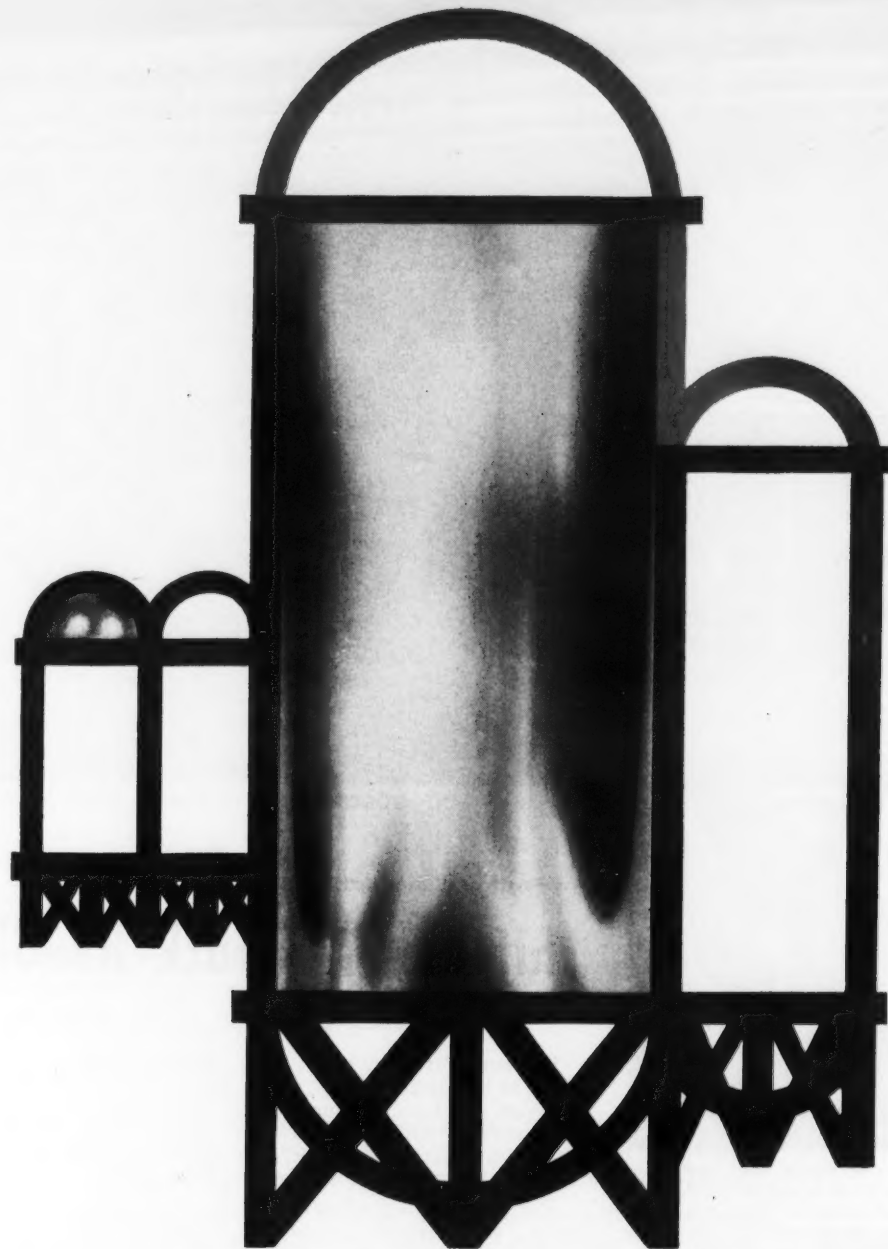
Fume washers lined with a wide variety of corrosive materials, according to particular applications, are described and illustrated in eight-page publication. Typical installations are shown. Bul 90 — Maurice A. Knight Co., Kelly Ave., Akron 9, Ohio.

Check 4664 opposite last page.



*"Then it's agreed, gentlemen. We throw out all the machines and bring back the girls."*

Our thanks to Tom Blakley, Florida East Coast Fertilizer Co., Homestead, Florida.



## win the fight against corrosion—with Alcoa Aluminum

Chances are the staggering cost of corrosion is your most serious headache. If so, don't overlook this important possibility: there is probably a known—and proved—economical aluminum answer to your most serious corrosion problem. Alcoa engineers can show it to you.

Alcoa's corrosion specialists have accumulated over 1000 man-years' experience applying aluminum to solve corrosion problems in the process industries. Their un-

equaled experience has produced an immense fund of factual data on the behavior of aluminum with corrosive materials and in corrosive atmospheres. That data is at your service.

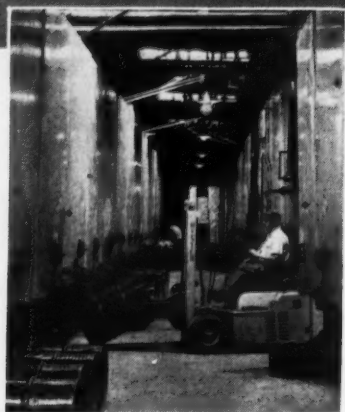
Let Alcoa's engineers show you how to *win the fight against corrosion—with Alcoa® Aluminum*. Outline your corrosion problems in a letter to ALUMINUM COMPANY OF AMERICA, 902-D Alcoa Building, Pittsburgh 19, Pa.

  
"ALCOA THEATRE"  
Exciting Adventure  
Alternate Monday Evenings

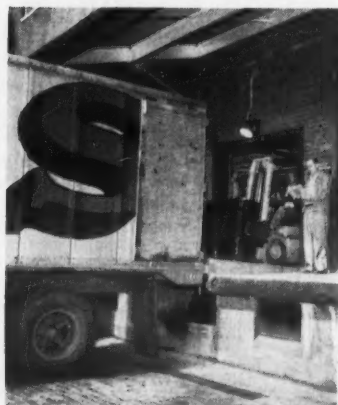


Specify Alcoa Aluminum for corrosion-free Process Equipment  
Pipe & Tube  
Tanks, Containers, Trucks & Cars  
Plant Structures

Check 4665 opposite last page



▲ Drums of varnish filled from these tanks are lifted to upright position and moved to storage or shipping two at a time using the "Load-Grab" attachment with rubber faced arms



► Bag handling and storing operations have been changed from manual to unit handling on cardboard sheets

◄ Low-height trucks maneuver easily up ramps and into trucks for loading and unloading operation

**At Pratt and Lambert, Inc.**

## shift to lift truck handling cuts costs 50%

**Problem:** For many years, handling at the Buffalo, N. Y., works of Pratt and Lambert, Inc., paint and varnish manufacturers, involved manual loading, unloading and movement of materials.

For example, unloading of box cars and trucks containing bagged material was accom-

plished with laborers who stacked bags onto a four-wheel hand truck and pushed truck to storage area. Hand labor was again required to transfer bags from storage to processing.

With such arrangements, increasing labor costs were adding heavily to material handling

overhead on the company's books.

**Solution:** Three 2000-lb capacity gasoline-powered lift trucks were purchased for all handling operations. Two trucks with standard forks and one with barrel clamp attachment are used to move everything from bags of pigment to drums of varnish.

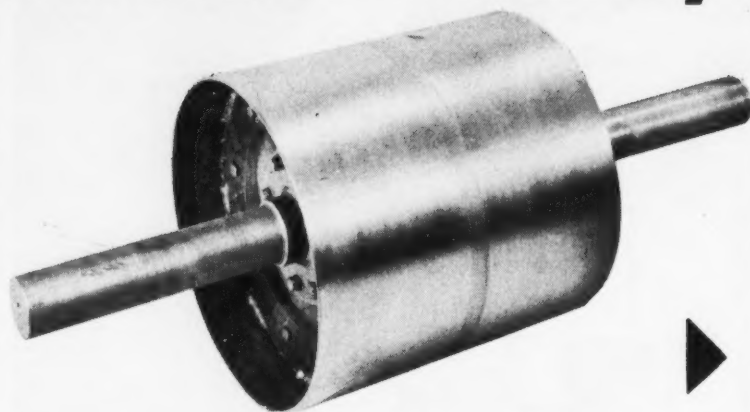
This particular model truck with special short uprights was chosen for its ease and speed of maneuverability, both inside and out, in narrow aisles and under low overheads.

Haul distances vary from 100 to 200 ft over concrete floors inside and over varied surface conditions outside. A pneumatic tire truck was chosen to minimize possibility of floor damage inside and offer traction for operating on truck and rail car ramps in all types of weather.

**Results:** Under new system, unloading and storing operations described above have taken on a



# Now! Revolutionary new Indox V Pulley\*



- Outperforms conventional permanent magnet pulleys
- Equals deep-field power of electromagnetic types,

**but...**

- ▶ costs nothing to operate
- ▶ free from power failures
- ▶ eliminates rectifier
- ▶ needs no maintenance
- ▶ eliminates heat
- ▶ impervious to moisture
- ▶ radial design boosts holding efficiency

Never before could you expect tramp iron protection like this with a permanent magnet pulley! Performance of the new Stearns Indox V pulley is equal to that of electromagnetic types—yet it has all the cost-saving advantages of permanent magnet design

Indox V is the amazing *ceramic* magnet material used exclusively in Stearns pulleys. It is the heart of an entirely new magnet assembly with *radial pole design*. This feature produces a strong magnetic field that blankets the conveyor burden, pulls out troublesome tramp iron far more efficiently than old-style permanent magnet pulleys.

The Indox V pulley needs no energizing current. It costs nothing to operate, requires no maintenance, ignores power failures.

Stearns Series "410" Permanent Magnet Pulleys — and Stearns "710" for deeper conveyor burdens — are available in standard widths from 12 to 48 inches, and in diameters of 12, 15, 18, 20 and 24 inches. Stearns engineers will help you select the right Indox V Permanent Magnet Pulley to match your conveyor system. Call your Stearns representative, or write for free literature.

\*Patents Pending

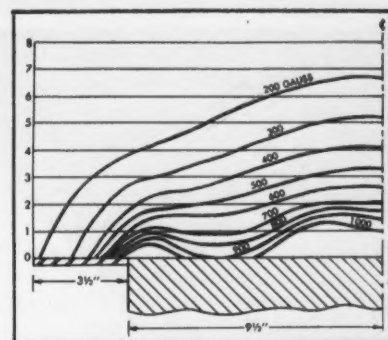


**STEARNS MAGNETIC PRODUCTS**

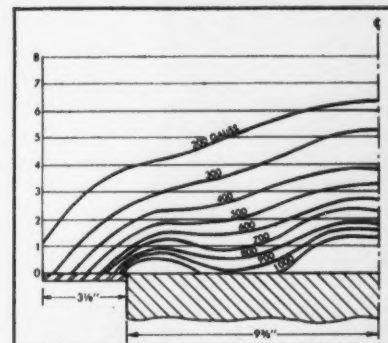
A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY

635 SOUTH 28TH STREET

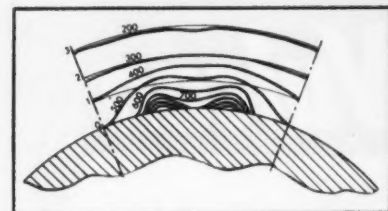
MILWAUKEE 46, WISCONSIN



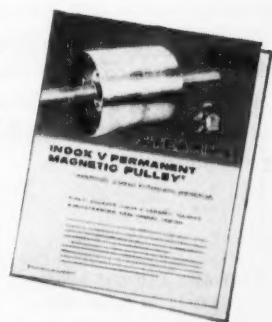
GAUSS PATTERN: SIZE 18 x 24 ELECTRO MAGNETIC PULLEY, AT 80% OF RATED CURRENT



GAUSS PATTERN: SIZE 18 x 24 INDOX V PERMANENT MAGNETIC PULLEY



GAUSS PATTERN: SIZE 18 x 24 ALNICO V PERMANENT MAGNETIC PULLEY



**Free Booklet** describes the new Stearns Series "410" and "710" Indox V Magnetic Pulleys. Write today for Bulletin 1021-P

Three 2000-lb capacity lift trucks have allowed Pratt and Lambert to cut material handling overhead as much as 50%. Trucks' shorter up-rights give them maneuverability under low ceilings such as above

new look. Now, bags are received in unit loads mounted on a 40 x 48" sheet of cardboard. Trucks transport them to storage where they are placed on pallet blocks. All materials have been palletized wherever practical. Carload of 800 bags of pigment can be unloaded and stored in five man-hours compared to eight for manual operation.

Drum handling, formerly requiring as many as five men using hand barrel-trucks and barrel skids, is now accomplished with attachment that handles or stacks either one or two drums. Trailer load of 70 drums of resin can be unloaded and stored in two man-hours compared to four man-hours previously needed.

Lift truck also solved problem involving unloading carloads of paper for printing of labels and stationery. Paper is

Check 4666 opposite last page



received by rail car and must be transported 100 ft to printing department dock, which is only 18 inches above ground level. Because of low dock height it was impossible to consider using road truck. A special ramp was built from rail car to street level and lift truck carries paper in unit loads down ramp and across street to printing department dock where it is handled with hand pallet truck.

In addition to handling production materials and products, Pratt and Lambert have adapted their trucks to many other uses around the plant. For example, in the maintenance of an overhead fan, one of their trucks raises a man to loosen the bolts which releases fan down onto a pallet. In only 20 minutes it can be loaded onto a road truck destined for electrical shop. Previous method involved time of both millwright and helper for full half-day to set up scaffolding and hoists.

(Hyster 20 Lift Truck is manufactured by Hyster Co., PO Box 4318, Portland 8, Ore.)

Check 4668 opposite last page.

**No wrinkles or folds —  
circular plastic liners  
fit drums exactly**

**Uses:** For insertion into either fiber or metal containers.

**Features:** Because liner does not wrinkle, no folds occur, and no product fill can be lost. Use of liner saves labor, since only one man is needed to insert. Both loading and unloading are simplified. Substantial savings in freight costs result from light weight of liner, when used in conjunction with fiber drums and cartons.

**Description:** Polyethylene cylindrical liner fits contour of container. Liners are constructed to resist rough usage. The closure, a simple plastic lid, is clamped into position making liquid-tight package.

(Polyethylene liner is product of General Packaging Co., Chester, Pennsylvania.)

Check 4669 opposite last page.

**Vulcan** delivers steel pails

*the incredible shrinking inventory costs!*

**faster,** SAVES YOU SPACE AND MONEY!

This is a true case history of all the companies who use Vulcan steel shipping containers. Their composite story reads like this: delivery of pails forced them to tie-up excessive funds and space in a big inventory. They switched to Vulcan, and got faster delivery, in all quantities, on a precise and rigidly maintained schedule. Their inventory needs dwindled rapidly, and they had more free cash and manufacturing space. The same thing can happen to you, because Vulcan is an expert authority engaged exclusively in the manufacture of steel pails and drums, and maintains the largest warehouse stock of these items. This means we can deliver your needs and inventory savings at the same time. May we prove it to you?

**NOW! REDUCE STEEL CONTAINER  
INVENTORY COSTS! MAIL THE  
COUPON TODAY FOR TEST SAM-  
PLES AND THE NAME OF YOUR  
VULCAN REPRESENTATIVE!**



Ni-Bake protective linings  
one to 55 gallon capa-  
cities all variations of  
open or closed heads  
faster delivery from the  
largest warehouse stock • from a carton to  
a carload • brand name decoration • special  
designs



**VULCAN**  
CONTAINERS INC.  
Bellwood,  
Illinois

**VULCAN CONTAINERS INC., Bellwood, Illinois**

Gentlemen: I am interested in: CP-48

- ☐ Pails, in the following sizes, .....
- ☐ Ni-Bake protective linings for (product) .....
- ☐ 55 gallon drums. ....

Please get this information to—

Name .....

Company .....

Address .....

City ..... Zone ..... State .....

Check 4667 opposite last page

## GOT PROBLEMS?

Interested in solving them?

Want to learn new ways of handling tough plant operation problems?

See...

CP's "New Solution" section as well as stories in other sections for the answers you need.

In each issue of **CHEMICAL PROCESSING** you will find numerous stories that will help you solve many of your problems.

You will find these highly informative stories covering all important phases of your operations — processing, safety, maintenance, material handling, packaging, corrosion to name a few.

These are specific case histories of how processing problems were solved, how someone else has solved the same difficult tasks that you may have.

Each...

"New Solutions" article states the operating problem... explains how it was solved... and describes results obtained.

For more information on product at right, specify 4670 see information request blank opposite last page.

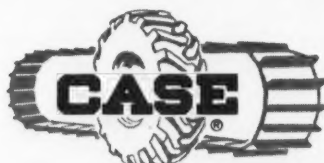


Save up to \$2000

**SEE and COMPARE the Case® W-9 Terraload'r before you buy**

**A** free demonstration will quickly convince you that the new Case W-9 Terraload'r will outperform competitive four-wheel-drive loaders costing up to \$2000 more. Main reason is the W-9 has better balance and stability to maintain traction on all four drive-wheels, when digging or traveling with heavy loads. Short, rigid lift arms — pivoted **AHEAD** of operator — give better visibility, increase dumping reach, and eliminate danger of catching operator's arm in lifting mechanism.

Like other Case industrial wheel and crawler units, the W-9 Terraload'r is sold and serviced under one factory warranty, by reliable Case heavy construction machinery dealers everywhere. Fifteen centralized Case industrial parts depots insure fast delivery of parts anywhere in the U. S. and Canada. Long-term financing and LEASE plans are also available to help you obtain new equipment now on easy monthly terms, without tying-up needed capital. Mail coupon for full details.



1st in Quality for over 100 years

## Quick facts

- 1¾ to 2¾ cu. yd. heaped capacity
- 11,000 lbs. break-out force, 5,500 lbs. carrying capacity
- Four-wheel-drive, with rear-wheel power-steering
- Power-boosting torque converter, plus full power-shift in all speed ranges, as well as forward and reverse.
- Choice of 4-cylinder valve-in-head Case diesel or gasoline engine for maximum operating economy

*Clip...mail for free catalog*

**J. I. CASE CO., Dept. D1548, Racine, Wis., U.S.A.**

☐ Send free catalog on W-9 Terraload'r

☐ Have dealer representative call

Name ..... Title .....

Company .....

Address .....

City ..... State .....

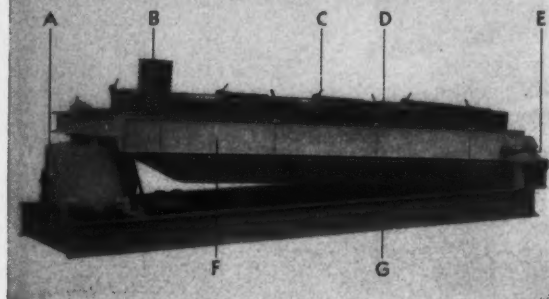
C-TL-149

**Industrial wheel and crawler tractors  
loaders • dozers • backhoes • fork lifts • engines**

# ROTEX

## SCREENERS

### GIVE PROFITABLE PRODUCTION!



- A Quiet Running Counter-Balanced Drive
- B Flexible Rubber Inlet and Outlet Sleeves
- C Quick Release Cover Clamps
- D Rubber, Dust-Tight Inspection Ports
- E Self-Aligning Slide Bearings
- F All Metal Screen Box
- G Heavy Welded Structural Steel Base

For over 40 years ROTEX Screeners have been widely used throughout industry. Today there are installations in the United States and over 25 foreign countries. Built for dependable service, ROTEX are long known for accuracy, capacity and operating economy.

#### ROTEX SCREENING ACTION:

The nearly level, gyratory motion, pioneered in ROTEX, conveys materials rapidly over screen surfaces with minimum vertical vibration or hop. This stratifies the material by particle size, rapidly passing undersize particles through the mesh openings. The results are clean separations of exacting accuracy coupled with high capacity. Designed for operating convenience, ROTEX Screeners pay for themselves by the economies they effect.

#### ROTEX WIDE SELECTION:

To meet your requirements: 25 standard models—one to five screen surfaces—many semi-standard and special models—sanitary and all-metal construction available.

Write for Bulletin 401 and information on your screening requirements. Our engineering staff will be pleased to cooperate with you.

#### ROTEX FEATURES

- Low head room
- No screen blinding
- Fast screen changes
- Dependable service
- Dust-tite construction
- Rugged construction

# ROTEX

## The Orville Simpson Co.

1246 Knowlton St., Cincinnati 23, Ohio

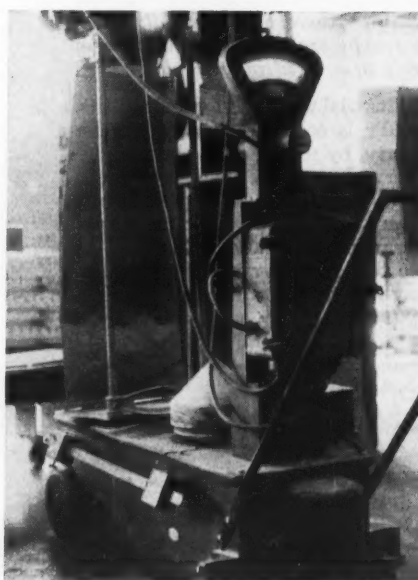
## MATERIAL HANDLING & PACKAGING



Operator bags fifty lb, plus one ounce, minus zero ounce . . . consistently. Supply hopper is refilled from bin when bag is loaded. Bag sewing is at left

'We are using semi-automatic bagging scales. The reason we have this equipment is that it gives us greater accuracy.'

## Scales 50-pound bags to plus 1 ounce, minus zero ounce



Close-up of mobile scale unit

**WILLIAM C. CLARKE**  
Assistant Editor

**GEORGE P. KOVACH**  
Manager, Product Development  
Foster Grant Company, Inc.  
Leominster, Massachusetts

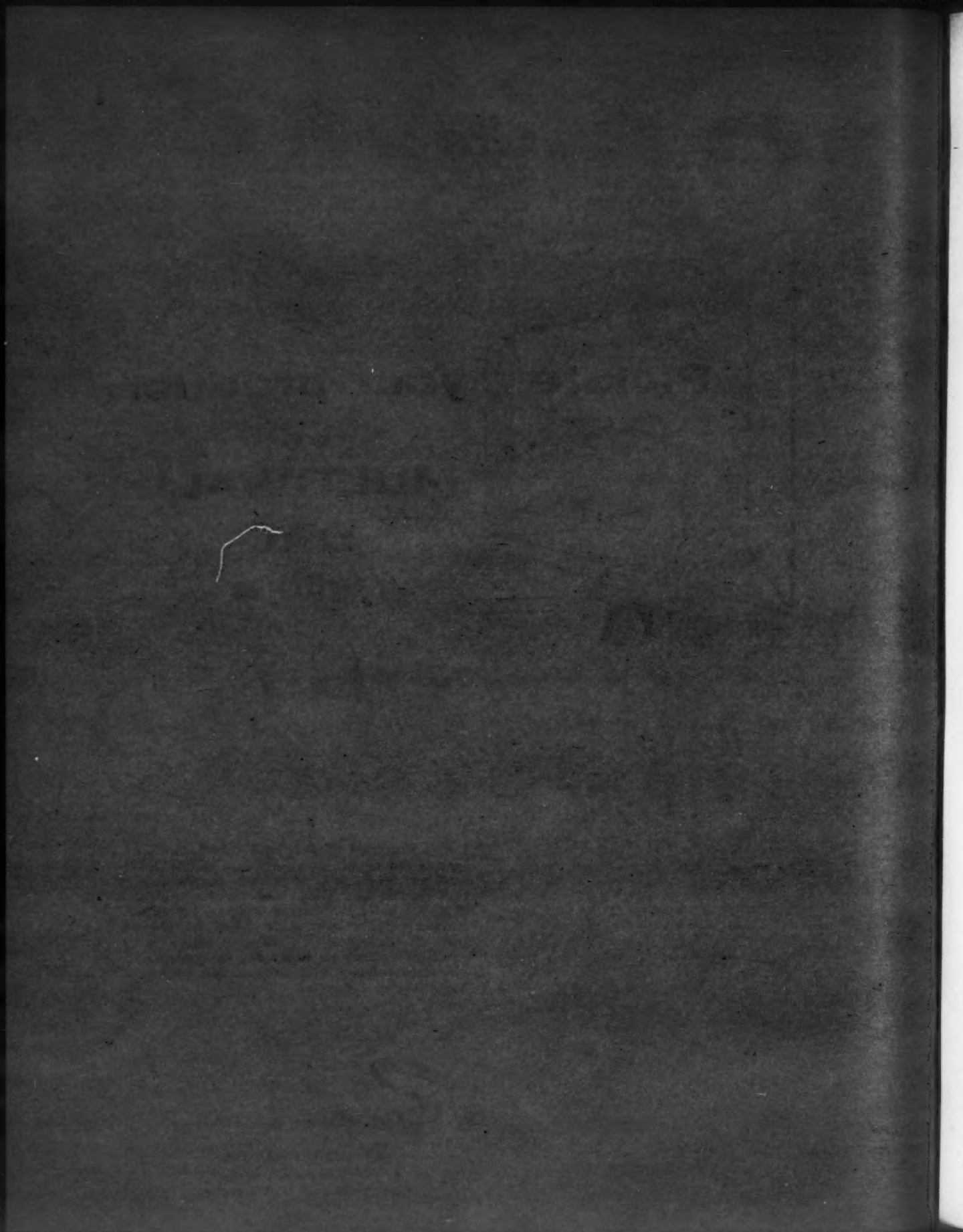
**Problem:** Scaling of polystyrene pellets and granules at Foster Grant Company in Leominster, Mass., by hand scale frequently resulted in over-weighing. Consequently, contamination was possible because additional weight had to be scooped from the overweight bag. As product was drawn for bagging from up to ten bins intermittently, movable platform scales were used. Constant transfer of scales be-

For more information on product at right, specify 4672 . . . see information request blank opposite last page.

Check 4671 opposite last page







tween bin scaling locations was hard on scale knife edges.

Additional factor in the scaling problem was that the dusty atmosphere created conditions conducive to inaccurate weighments with dust buildups on scale movements.

**Solution:** In 1952, engineers at Foster Grant Company investigated the problem of improving the bagging operations. After a number of tests, they concluded that a completely automatic operation could not be justified. The semi-automatic weighing units promised greater accuracy. After some further test work, the company standardized on use of five semi-automatic weighing machines. Also, on each of ten bins, there was installed an air-operated slide valve.

Scale system employs an even balanced lever design with a visual indicator and dial. Each weighment can be observed. Machine may be stopped on any load to visually check accuracy.

Immediately below each bin for styrene granules or pellets there is installed a separate hopper of sufficient size to hold a little better than fifty pounds of granules or powder. Air-operated slide valve mounts directly below the supply hopper. Air cylinder mounted on supply hopper closes valve to supply hopper during bag scaling cycle. Alternately, valve controlling scaling into bag closes when supply hopper is being filled from bin.

#### Pushbutton Start

Actual operation of the unit requires only that operator press "start" button. Material from supply hopper is allowed to fall through two-speed filling slide valve into bag. As bag weight nears 49½ pounds, slide valve partially closes. With material flow slowed to a trickle, final cutoff occurs with a minimum of material in suspension. With removal of bag from scale, supply hopper is refilled from bin.

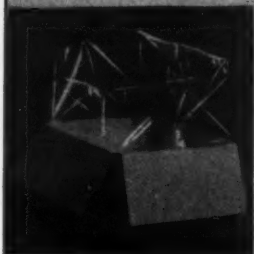
Foster Grant sets its scales to weigh 50 pounds plus 1 ounce. Statistical analysis of their weighing problems has



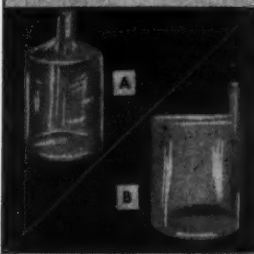
Peel-Over



"All-Chem" Spout



Carton Liners



(A) Conical-Sleeve Spout  
(B) Flat-Sleeve Spout



"TWIN-SURE"  
DOUBLE-SEAL

Manufacturer of the  
famous "TWIN-SURE"  
DOUBLE-SEAL  
Leak-proof Liners



**PROTECTIVE'S  
SUCCESS!**

Tie-Off

**The First and The Best**

**"POWER-SEAL"\***



FOR

**DRUMS • CANS • PAILS**

**and SPECIALTIES**

**All Diameters • All Heights**

**SCIENTIFICALLY** sealed POLYETHYLENE, Mylar, and Copolymer Vinyl—with guaranteed safety.

**PERFECTLY** made to insert easily and fit exactly all types of ROUND CONTAINERS.

**EFFICIENTLY** made for top tie-off; for peel-over with separate disc-top cover; or with spouts, including our special HEAVY DUTY "ALL-CHEM" LINER for attachment to Rieke Flexspout.

**LOGICALLY** made to solve "square pegs in round holes" with simplified round-liners to fit ROUND CONTAINERS—ECONOMICALLY.

**Write, wire, or 'phone us collect—for information and free samples.**



**PROTECTIVE  
LINING CORPORATION**

32 WOODHULL STREET, BROOKLYN 33, N. Y.

Check 4673 opposite last page



# Ask Standard

*how to  
cut costs with  
conveyors*



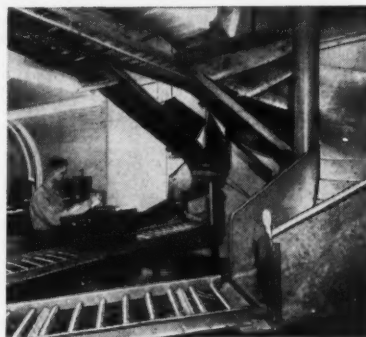
Although over 19,000 items are stocked, conveyors permit fast and efficient assembly, checking and packing — orders ride safely in durable, lightweight tote boxes.

## Milwaukee wholesale drug firm ups order-filling 50% with 3-floor conveyor system

WITH conveyors, The F. Dohmen Company, Milwaukee, Wisconsin, designed a system which has permitted them to fill upwards of 50% more orders per day . . . reduce to a minimum, excessive overtime costs . . . reduce errors, delays and merchandise damage. Standard belt and roller conveyors connect every department in the firm's three-story warehouse.

This installation is typical of what Standard can do to solve material handling problems. Standard designs and builds permanent and portable systems and units, using roller, belt, slat, chain, pushbar or sectional conveyors — power or gravity; also spiral chutes and pneumatic tube systems.

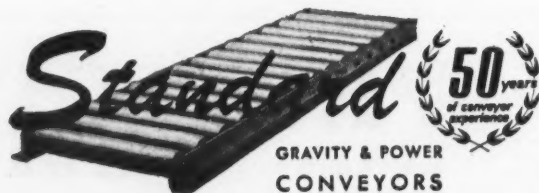
For complete facts, consult STANDARD CONVEYOR COMPANY, General Office: North St. Paul 9, Minnesota. Sales and Service in Principal Cities.



Floor-to-floor route of conveyor system assures minimum wasted motion by employees. Above, "close-out" checker makes final inspection of orders.



For details on Standard Conveyors of all types, contact the Standard representative listed in your classified phone book or write direct. Ask for Dept. P-4.



GRAVITY & POWER  
CONVEYORS

Check 4674 opposite last page

## HANDLING & PACKAGING

indicated that with scales so set, each bag can be guaranteed to be 50 pounds even. Operation has been within plus one ounce, minus zero ounce, range.

### How's Maintenance?

Maintenance has been minor. The units, despite movement between bin loading stations, have stood up very well. As a matter of routine, adjustments have been required only with change in particle size.

Inplant operation policies of Foster Grant require dead-weight checks every hour. This means that a fifty-pound weight is placed on the scale and a check weight made. Discrepancies have been relatively few.

**Results:** "We are using semi-automatic bagging scales. The reason we have this equipment is that it gives us greater accuracy." The use of the unit has eliminated overweighing and consequently any possibility of contamination that might occur through scooping out excess material. Scaling time of bags, while not an important point because of production rates of equipment earlier in cycle, remains at approximately 20 to 30 seconds per bag depending upon material handled.

(Bagging equipment was designed and built by Exact Weight Scale Company, 944 W. Fifth Ave., Columbus, Ohio.)

Check 4675 opposite last page.

## Vibrator units redesigned for more power, compactness

Rotating design is silent,  
maintenance costs reduced

**Uses:** To provide vibration on bins, chutes, and hoppers for handling all types of dry or viscous bulk materials.

**Features:** New design provides more powerful unit that is easier to handle and install. Unit is inherently silent; there are no reciprocating parts, and the only moving

These shipper  
conscious railroads have

# PS-2

COVERED HOPPERS  
in service or on order  
to serve your bulk  
shipment needs

Atchison, Topeka & Santa Fe  
Baltimore & Ohio  
Bessemer & Lake Erie  
Boston & Maine  
Canadian National  
Central of Georgia  
Central Railroad of New Jersey  
Chicago & North Western  
Chicago, Burlington & Quincy  
Chicago Great Western  
Chicago, Milw., St. Paul & Pacific  
Chicago, Rock Island & Pacific  
Cinchfield  
Delaware & Hudson  
Denver & Rio Grande Western  
Detroit, Toledo & Ironton  
Duluth, Missabe & Iron Range  
Elgin, Joliet & Eastern  
Florida East Coast  
Great Northern  
Illinois Central  
Kansas City Southern  
Lancaster and Chester  
Lehigh Valley  
Lehigh & New England  
Louisville & Nashville  
Maine Central  
Minneapolis & St. Louis  
Missouri-Kansas-Texas  
Monon  
New Haven  
New York Central  
Norfolk & Western  
Northern Pacific  
Pennsylvania  
Pittsburgh & West Virginia  
Rutland Railway  
St. Louis-San Francisco  
St. Louis Southwestern  
Southern Railway  
Soo Line  
Southern Pacific  
Union Pacific  
Wabash  
Western Maryland  
Western Pacific  
Wisconsin Central

## These users have discovered the benefits of PS-2 ownership!

American Sugar Refinery Co.  
Canadian General Transit Co.  
Central Soya  
General American  
J. C. Corrigan Co.  
National Sugar Refinery Co.  
North American Car Co.  
Philadelphia Quartz  
St. Joseph Lead Co.

## PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

221 NORTH LA SALLE STREET • CHICAGO 1, ILLINOIS  
BIRMINGHAM • PITTSBURGH • NEW YORK • SAN FRANCISCO

CHEMICAL PROCESSING

## HANDLING & PACKAGING

part is the rotor. Design is said to reduce maintenance costs appreciably.

**Description:** Electric vibrating unit develops maximum vibrating impact of 2250 lb. It weighs 84 lb, and the overall length is 13 1/8". Mounting base provides for easy installation and better support of vibrator. Heavy-duty wiring is used.



Silent electric vibrator redesigned as more compact, more powerful unit

Vibrator idles at 200 watts on 220 volts. Also available are 110-, 440-, and 550-volt models. Unit operates on rotating eccentric weight principle. It can be equipped with adjustable eccentrics permitting vibration impact to be varied between 750 and 2250 lb.

(RC-50 electric vibrator is manufactured by The Cleveland Vibrator Company, 2828 Clinton Ave., Cleveland 13, Ohio.)

Check 4676 opposite last page.

### **Stainless steel Tote units, are now available**

Manufacturer of bulk and liquid handling bins and tanks of aluminum has added units of stainless steel construction to its line. Two hundred stainless steel bins were recently constructed for bulk handling of plastics and resins.

Containers, either aluminum or stainless steel, can be hermetically sealed and are adaptable for shipping, storage, and as discharge hoppers.

(Tote Bins and tanks are available from Tote System, Inc., Beatrice, Nebr.)

Check 4677 opposite last page.

# Be sure your bulk shipments always arrive clean, safe and dry



PS-2 Covered Hoppers available in 2,003 and 2,893 cubic foot capacities.

## Specify **PS-2 COVERED HOPPERS** from your railroad

Pullman-Standard PS-2 Covered Hoppers assure you complete protection of dry bulk commodity shipments. PS-2 roof hatches and outlet gates are designed to keep weather and dirt out. Center pressure locking keeps hatches tightly closed. PS-2s unload clean—smooth interiors won't trap lading or cause contamination. Your bulk lading gets complete, all-around protection—arrives clean, safe and dry.

And handling of bulk commodities is faster, more economical with PS-2 Covered Hoppers. Mechanical load-unload devices work to fullest advantage—helps you make even greater profits through bulk shipment.

For complete information on the bulk shipping benefits of the PS-2 Covered Hopper, write to Pullman-Standard and ask for Booklet J-6489.



## **PULLMAN - STANDARD**

**CAR MANUFACTURING COMPANY**  
SUBSIDIARY OF PULLMAN INCORPORATED  
221 NORTH LA SALLE STREET • CHICAGO 1, ILLINOIS  
BIRMINGHAM • PITTSBURGH • NEW YORK • SAN FRANCISCO

## **PS-2s**

**CAN PRODUCE EXTRA SHIPPING BENEFITS FOR SUCH CHEMICAL PRODUCTS AS:**

- Carbon Black
- Catalyst Alumina
- Crude Arsenic
- Cyanide
- Ferro-magnesium
- Ferro-silicon
- Fertilizers
- Ground Calcium
- Lime
- Magnesium Chloride
- Nitrates
- Plastic Molding Powder
- Potash
- Soda Ash

Check 4678 opposite last page

# APPLETON type "ECC"

*explosion-proof, dust-proof cable connector*

(CLASS I, GROUPS C and D; CLASS II, GROUP G)

## HANDLING & PACKAGING

**Heat-sealable film looks like foil, has film properties**

Retains properties from -70 to 230°F

**Uses:** Material is designed for packaging applications where both low water vapor and gas permeability and appearance are important factors.

**Features:** Although it looks like aluminum foil, material can be flexed almost indefinitely without affecting its film properties. Film retains its properties in temperatures in a range of -70 to 230°F, and displays excellent heat reflectivity with very low heat conductivity.

### Metalized Version

**Description:** Heat-sealable polyester film is metalized version of manufacturer's conventional-brand heat-sealable polyester film. The 2-mil caliper film is especially suited for packaging materials which must retain volatile elements during storage periods.

It has a water vapor permeability of .02 gms/100 sq in/24 hr. Air permeability is .2 cc/100 sq in/24 hr, and oxygen permeability is .6 cc/100 sq in/24 hr.

Tensile strength of film is 8000 lb/sq in while burst strength (Mullen) is 40 lb/sq in.

(Metalized version, No. 20A20, "Scotchpak" polyester film is product of Minnesota Mining and Mfg. Co., 900 Bush St., St. Paul 6, Minn.)

Check 4680 opposite last page.

### Steel rack development permits barrel handling with ordinary fork truck

Special equipment eliminated; space saved

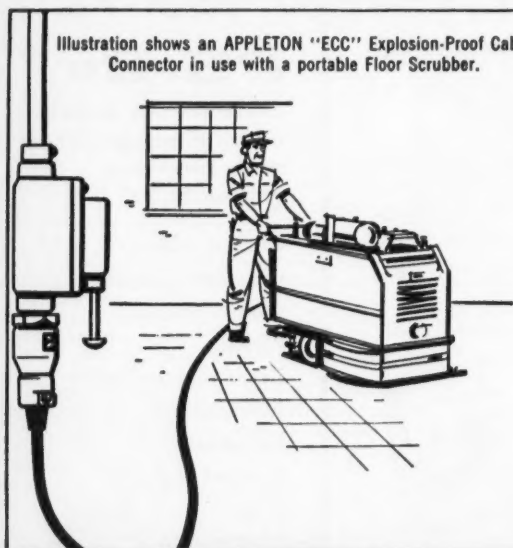
**Uses:** For handling and stacking of loaded or empty barrels and drums.

**Features:** Design permits handling and stacking of loaded or empty barrels with standard fork lift trucks. Special drum handling equipment



**A factory-sealed, explosion-proof connector used between a portable extension cord and an explosion-proof outlet or housing**

Illustration shows an APPLETON "ECC" Explosion-Proof Cable Connector in use with a portable Floor Scrubber.



From its rugged aluminum housing which withstands years of extreme rough usage, to its lead wires protruding 12" from the body for faster, easier splicing, this APPLETON "ECC" Connector has every desirable quality feature.

The current carrying lead wires for example, are solidly moulded into the connection blocks: can't work loose under vibration. An auxiliary cord clamp is provided to prevent strain on the wire connectors resulting from sudden tugs on the cord. This clamp fastens tightly by screw pressure on a tapered rubber bushing in the form of a sleeve...effectively sealing the cord entrance. Three pressure-type solderless lugs on the load end of the "ECC" allow quick connections to be made with Type S Rubber-Covered Cord in ranges of #18 to #12, AWG. The grounding connector is plainly identified with a letter "G" on the block. Only the APPLETON Type "ECC" Explosion-Proof, Dust-Tight Cable Connector offers so many worthwhile features for such an economical price.

*Sold Through Franchised Wholesalers Only*

**APPLETON ELECTRIC COMPANY**



Also Manufacturers of:



"ST" Series Connectors

Outlet Boxes



Malleable Iron Outlet Fittings



Reelites

Check 4679 opposite last page



# X MARKS THE CRITICAL SPOTS!



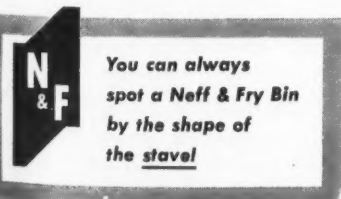
## It takes more than muscles to build a storage bin

Before the physical work of building a bin begins, we must know the problems involved at the Three Critical Points.

- X What is the loading problem?
- X What are the characteristics of the material to be stored ... and its "flowability"?
- X What is the volume and rate of discharge?

When planning your next storage bin, may we sit in on the very early stages of planning?

**NEFF & FRY COMPANY**  
166 Elm St., Camden, Ohio

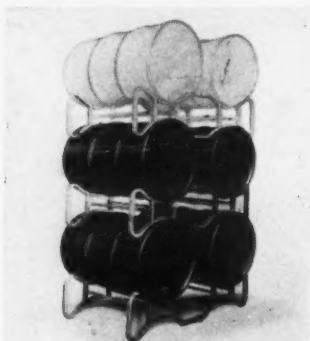


## HANDLING & PACKAGING

is eliminated. Rack provides safe, quick and easy handling and makes it possible to store more in-use drums in less space.

### High Capacity

**Description:** Barrel racks are made of heavy-gage channel steel, strongly braced and welded. One unit will support 7500 lb in 18-gage drums, and 14,000 lb in 16-gage drums. Racks are enameled to offset rusting.



Steel racks permit safe, quick and easy handling of barrels and drums, and makes possible more efficient utilization of space

Any standard fork lift truck can pick up, move, and stack as many tiers of loaded drums at one time as its lifting capacity permits. Handling of loaded containers with barrel rack is safer because there is little chance of container contact. Due to design of rack, drums or barrels are isolated from each other. Rack supports two loaded barrels and makes easy the stacking of pairs of containers to any practical height.

Great flexibility of handling and storage is provided because individual drums or pairs of drums can readily be removed without excessive handling of other drums in stack.

Racks also simplify draw-off of bunged drums.

(Steel barrel rack is product of Pressed Steel Div., Republic Steel Corp., 6100 Truscon Ave., Cleveland, Ohio.)

Check 4682 opposite last page.

# SHIPPERS OF CHEMICALS know Continental puts extra service into every steel container

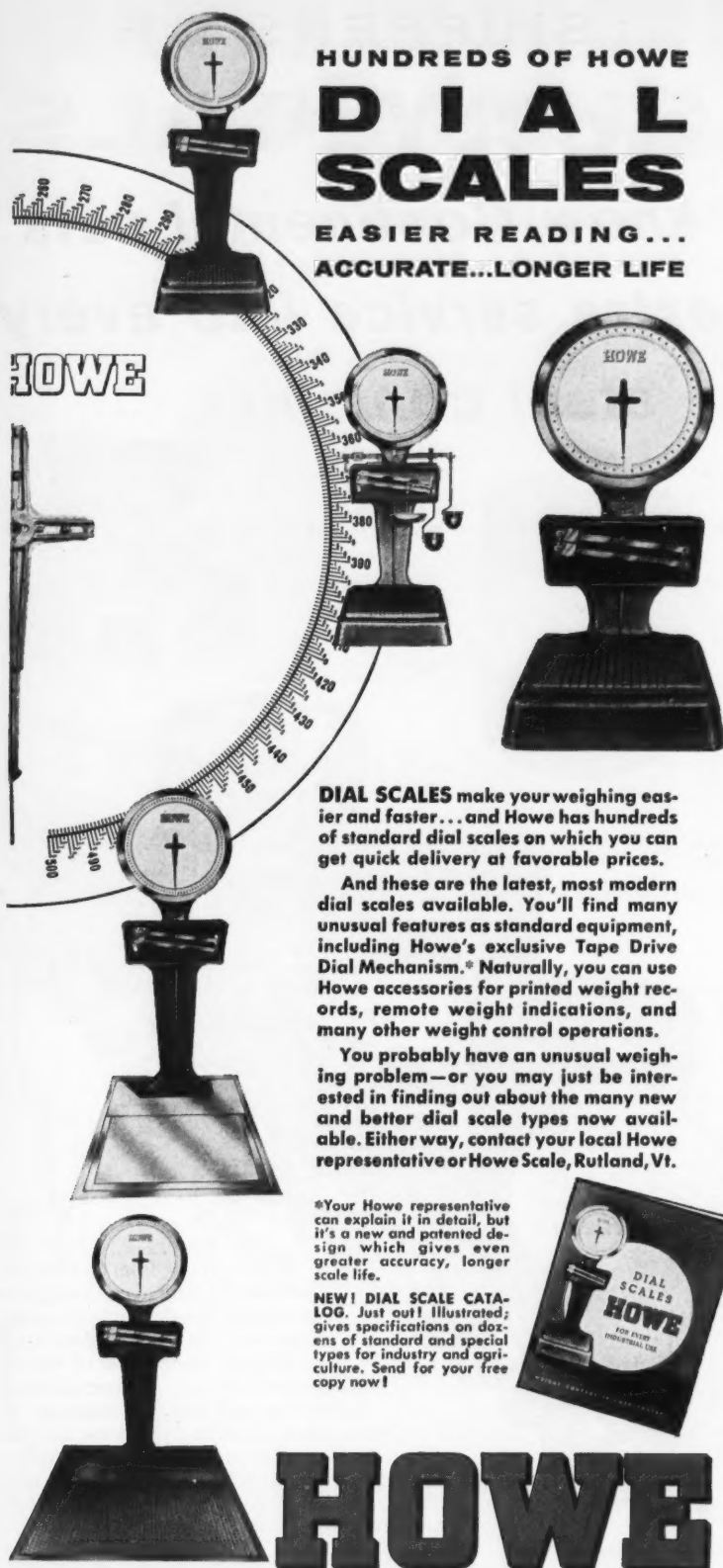


Extra service from Continental smooths the path of many shippers of chemicals. Besides highest quality containers, Continental gives these shippers the benefits of famous Continental service... faster delivery, engineering and research assistance in solving their packaging problems, and the special protection of Perma-Lined containers for hard-to-hold chemical products. Solve *your* chemical shipping problems with Continental's steel container service. Call today.

**CONTINENTAL CAN COMPANY**

Eastern Division: 100 E. 42nd St., New York 17 Central Division: 135 So. La Salle St., Chicago 3 Pacific Division: Russ Building, San Francisco 4

Check 4683 opposite last page



## HUNDREDS OF HOWE DIAL SCALES

EASIER READING...  
ACCURATE...LONGER LIFE

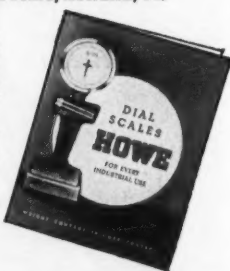
**DIAL SCALES** make your weighing easier and faster... and Howe has hundreds of standard dial scales on which you can get quick delivery at favorable prices.

And these are the latest, most modern dial scales available. You'll find many unusual features as standard equipment, including Howe's exclusive Tape Drive Dial Mechanism.\* Naturally, you can use Howe accessories for printed weight records, remote weight indications, and many other weight control operations.

You probably have an unusual weighing problem—or you may just be interested in finding out about the many new and better dial scale types now available. Either way, contact your local Howe representative or Howe Scale, Rutland, Vt.

\*Your Howe representative can explain it in detail, but it's a new and patented design which gives even greater accuracy, longer scale life.

**NEW! DIAL SCALE CATALOG.** Just out! Illustrated; gives specifications on dozens of standard and special types for industry and agriculture. Send for your free copy now!



# HOWE

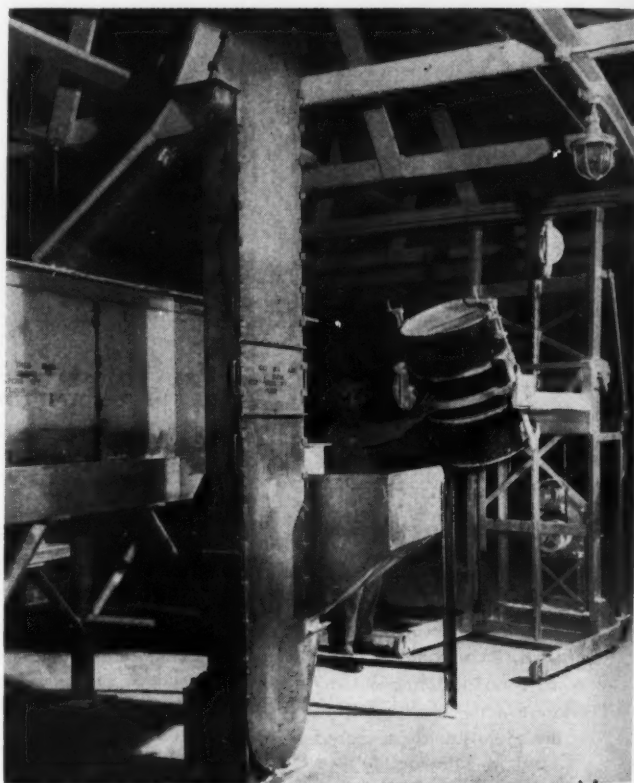
**THE HOWE SCALE CO. • RUTLAND, VERMONT**  
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

Check 4684 opposite last page

## MATERIAL HANDLING and PACKAGING

Stainless steel bucket elevator, with some unique design features, met stringent requirements by Berkeley Chemical Co., to . . .

## handle increased production inexpensively and



Stainless steel, dust-tight conveyor elevator raises 10,000 to 12,000 lb per hour of 50/lb cu ft material to ribbon blender

**Problem:** Berkeley Chemical Co., Berkeley Heights, N. J., manufacturers of pharmaceutical products, discovered that size of blender required to meet increased production demands was such that it was impractical to load it by hand or lift trucks.

It was decided that a mechanical bulk material elevating conveyor would be best suited for loading the blender because it could be fed by the

operator at floor level. But, such a conveyor elevator would have to meet some stringent requirements, dictated by the process.

Unit would have to be corrosion resistant. Ease of cleaning was imperative. Dust tight construction was required. No internal or sharp crevices would be tolerated. Cost had to be reasonable. Safety, and ease of installation, operation and maintenance.

# demands efficiently

nance were prime requisites.

**Solution:** A stainless steel conveyor elevator was selected. Production rates called for an elevator to continuously raise materials approximately 11 ft at 10,000 to 12,000 lb per hr. Bulk density of material to be handled is approximately 50 lb per cu ft.

Because of variety of products blended at different times in this system, it was necessary that the unit be capable of being rapidly and easily cleaned. Interior had to be accessible to operator without assistance of a mechanic. Cantilever design of top and bottom pulley shafts permits use of completely removable side panels on the elevator from top to bottom. These panels are limited to 5-ft overall length to facilitate handling. They are held in place by toggle clamps.

Buckets are held away from belt by thick washers preventing accumulation of material between bucket and belt. For complete cleaning, pulleys, shafts, and belt (with buckets) may be removed easily from cover side of unit.

Panels are gasketed with white food grade neoprene to insure dust tightness. Both top drive shafts and bottom take-up and idler shafts are furnished with easily disassembled, dust tight, mechanical seals.

All corners in the elevator's casing are made with generous radii to prevent hang-up of material. This makes cleaning of interior much easier. Bottom receiving section is made with a gentle contour to further eliminate corners. At the top, a contour discharge increases operating efficiency



# VISQUEEN 'L' FILM


TRADEMARK



If you make giant balloons light and strong enough to soar into the upper atmospheres . . . or ship corrosives, acids and adhesives . . . or transport hydroscopics in drums or cartons—look to VISQUEEN 'L' film to do the job better, less expensively. VISQUEEN 'L' film is stronger . . . tougher . . . as pinhole free as a polyethylene film can be. Write for samples.

**VISQUEEN** film—the first and foremost polyethylene film.

A product of the long experience and outstanding research of

**VISKING COMPANY** Division of  **Corporation**  
P.O. Box CP4-1410, Terre Haute, Ind.

In Canada: **VISKING COMPANY DIVISION OF UNION CARBIDE CANADA LIMITED**, Lindsay, Ontario.

**VISQUEEN** and **VISKING** are registered trademarks of Union Carbide Corporation.



Check 4685 opposite last page





### Cleveland Offers Quiet Vibrators

The Cleveland Vibrator Company offers an electric vibrator that is quiet—no rattling, buzzing or banging—these vibrators make no more noise than an electric motor.

Cleveland Silent Electric Vibrators work on the rotating eccentric weight principal. Two cam like weights are revolved at 3600 rpm. setting up terrific vibrational forces.

### Corrosion Proof Enclosure

Vibrator malfunction through corrosion or ex-

posure to the elements is eliminated by using Cleveland Electric Vibrators. They are enclosed in a heavy cast steel housing and power is supplied through a neoprene insulated lead.

### Easy to Install

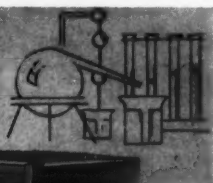
Cleveland Silent Vibrators can be installed quickly and simply. All that is required is to weld a base plate and mounting bracket to the bin. The vibrator can then be quickly slipped onto the bin.

### Catalog Gives Details

Cleveland Silent Electric Vibrators are available in four sizes. Complete operating data, dimensions and prices are given in Cleveland Catalog No. 11. Write for your copy today, to The Cleveland Vibrator Company, Dept. C4, 2706 Clinton Ave., Cleveland 13, Ohio.

Check 4686 opposite last page

## FOR ABSOLUTE LABORATORY UNIFORMITY...



## THE Marion MIXER

### ... IS STILL THE LEADER

#### FOR MIXING:

- Dry and Semi-Wet Chemical Powders
- Agricultural Chemicals
- Materials for the Plastics Industry
- Materials for Chemical Processing Plants
- Sweeping Compounds
- Pharmaceuticals
- Fertilizers

A uniform mix is assured time after time, no matter how complicated the formula, and with laboratory exactness. If the formula is right—the MARION MIXER will mix it with complete accuracy.

THE EXCLUSIVE MARION MIXING and BLENDING ACTION will handle any type of chemical materials and give a top quality mixed product at less cost.

Send Today For Free Descriptive Literature

**RAPIDS MACHINERY COMPANY**

865 11th Street

Marion, Iowa

Check 4687 opposite last page

## HANDLING & PACKAGING

and facilitates cleaning.

Cost of all stainless steel construction was not prohibitive since, in initial design of the unit, greater strength and high cost of stainless steel was taken into consideration. All unnecessary weight was either eliminated or compensated for through external use of less costly carbon steel outside the product zone.

Safety aspects of the unit include explosion-proof motors, in addition to non-sparking characteristics of stainless steel. Light weight and reasonable size of removal panels account for maximum personnel safety. And, dust tight construction further protects operators from exposure to materials being handled.

Operation consists primarily of pushing starting button and dropping ingredients into feed hopper. Using a drum lift, operator dumps material into waist-high feed hopper. Material flows from hopper into unit which carries it into ribbon blender.

Only maintenance required is semi-annual greasing of four main bearings and checking oil in gear reducer.

**Results:** Berkeley Chemical has been able to meet production demands and process requirements with a low-cost, corrosion-resistant, dust-tight conveyor elevator. Of utmost importance is the increased safety to personnel by eliminating the necessity of their working on platforms or scaffolding as a method of feeding material to blender.

(No. 30 BUCK-EL conveyor elevator is manufactured by Bucket Elevator Co., 360 Springfield Ave., Summit, N. J.)

Check 4688 opposite last page.

### Hi-speed filler combines processing, canning into one operation

**Uses:** Machine packs liquids, viscous products, petroleum products, anti-freeze, liquid detergents, and many other canned products.

**Features:** Processing and canning are combined into



## TRERICE

PATENTED STEAM TRAPS

HAVE A ROTATING VALVE

... ASSURING NO LEAKAGE DUE TO WIRE DRAWING

No Steam Leakage  
No Wire Drawing

## IT ROTATES

With every discharge, the valve in a Trerice trap seats in a different position... a new seat... a steam tight seat every time! Discharging water impinges on the impeller... causes rotating action.

### EASIER MAINTENANCE

A Trerice trap can be inspected and cleaned without removing it from the line, or disturbing the high pressure bolts and gasket.

Removable cap permits quick access to valve and seat for inspection and maintenance.

### FREE TRIAL OFFER

We'll supply one, a dozen, or more Trerice steam traps for your operation on a FREE 60-day trial basis. Act now! Write today for bulletin 1400D containing complete engineering data, valve and orifice charts.

**H. O. TRERICE CO.** 1420-B West Lafayette Blvd., Detroit 16, Mich.

Sales Offices in Principal Cities of U.S.A. and Canada

Check 4689 opposite last page



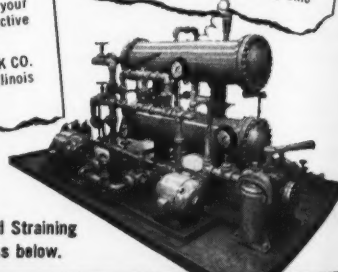
## Read what users say about SK Pumping, Heating, Straining Units

"We have operated our plant with your equipment for the past twenty-five years and it has given us satisfactory performance. During this period, we have had no shutdown due to any failure of your units. We would recommend your equipment to prospective customers."

THE CRACKER JACK CO.  
Chicago, Illinois

"... we are mighty happy to report that we have had excellent service from our fuel oil burning equipment which we have had in use for some seven years. As far as we know, this equipment has not given us any difficulty in its operation and also has been very efficient."

THE CRYSTAL TISSUE COMPANY  
Middletown, Ohio



Send for a copy of Bulletin 16H on SK Pumping, Heating, and Straining Units. Write to address below.



**Schutte and Koerting COMPANY**  
MANUFACTURING ENGINEERS

2215 STATE ROAD, CORNWELLS HEIGHTS, BUCKS COUNTY, PA.

Jet Apparatus  
Ask for Condensed  
Bulletin J-1.

Rotameters & Flow  
Indicators. Ask  
for Condensed  
Bulletin 16 RA.

Valves. Ask for  
Condensed Bulletin  
16 V-1.

Heat Transfer  
Apparatus. Ask  
for Condensed  
Bulletin HT-1.

Gear Pumps. Ask  
for Bulletin 17-4.

Check 4690 opposite last page

CHEMICAL PROCESSING

## HANDLING & PACKAGING

one precise, faster, and more sanitary operation with lower maintenance costs.

**Description:** High-speed unit fills containers in wide range of sizes and materials including glass, tin, aluminum, and plastic at rates up to 1000 containers per minute. Both piston- and gravity-type fillers are available. Piston types will be available in sizes up to 36 stations for high-speed filling of containers from three ounce to five quart sizes. Gravity models will fill up to 425 containers per minute in sizes of up to 46-ounce capacity.

(Votator filler is available from Girdler Process Equipment Div., National Cylinder Gas Company, 224 E. Broadway, Louisville 1, Ky.)

Check 4691 opposite last page.

## Puder on IPD

From page 45

Serious packaging, storing, or shipping problems are unlikely. But is this the most economical product-form for our customer's use?

If the product is hygroscopic or tends to cake, it may be difficult for our customers to handle. Perhaps it could be changed to a briquette, flake, pellet, slurry, or paste. One or several of these forms might be more adaptable to our customers' processes.

## Methods

A well-integrated product distribution system requires effective controls and communications. Rapid dissemination of information is essential. Properly timed, control of product movement is achieved through effective application of high-speed data transmission, recording, and computation devices. In addition to reducing clerical labor, these devices minimize delay in recording and summarizing essential information (production, sales, and inventory) and invoicing shipments.

The flow of data can be screened to call attention to unusual situations which fa-

# ONE EXTRA LINE

**on equipment purchase orders  
will save you a lot of money!**



When you buy processing equipment that will be exposed to the attack of corrosive fumes or chemicals, you can save yourself future headaches and maintenance expense by adding the one extra line:

"This equipment is to be protected with Tygon Paint, applied as per the instructions of The U. S. Stoneware Co."

It should add little to the cost of the equipment. It will add years to its life. For Tygon Paint has been proved by years of exposure to such corrosives as sulphuric, hydrofluoric, nitric, hydrochloric, sodium hypochlorite, potassium hydroxide — in fact, to most corrosive agents. (There are

a few, of course, to which Tygon is not fully resistant\*).

To safeguard your equipment against "downtime" from corrosive attack, specify "to be protected with Tygon Paint".

\* Bulletin 760 gives full technical data on Tygon Paints together with performance data under exposure to over 150 corrosives. Write for it today.



**U. S. STONEWARE**  
AKRON 9, OHIO

Check 4692 opposite last page



## VACUUM LAMMERT PUMPS



No matter what you need vacuum for, you will get dependable service from automatically lubricated Lammert pumps. Capacities—4.3 to 225 cubic feet per minute. From medium to high vacuum (up to 20 microns of barometer).

Write for catalog showing the complete line, including specifications, of Lammert pumps and compressors.

**LAMMERT & MANN CO., INC.**

1753 Walnut Street, Chicago 12, Illinois, SEeley 3-0383

Check 4693 opposite last page



For Unusual Applications, too—

### UNIVERSAL METAL HOSE

—adds flexibility, utility,  
and durability.

For example, —

#### UNIVERSAL U-140S STAINLESS STEEL EXHAUST TUBING

Fabricated from chromium-nickel, 302 alloy steel. Withstands exhaust temperatures to 1250° F. Supplied with copper wire packing for heavy duty exhaust service, this flexible hose product absorbs vibration by remaining permanently flexible.

For Full Particulars  
ask for Bulletin IPB—Sec. 3A.



Quality... ALL METAL FLEXIBLE HOSE PRODUCTS

**UNIVERSAL METAL HOSE CO.**

2189 South Kedzie Avenue • Chicago 23, Illinois

Check 4694 opposite last page

# Increase production...lower operating costs...with Viberlec Vibrators!



### Speed the full flow of bulk materials— reduce handling, shipping time and labor!

Bulk materials that respond to vibration, from the finest powders to large solid pieces, are moved most efficiently and economically through chutes, bins and hoppers by Viberlec electric external vibrators.

Viberlec is compact, powerful, practically maintenance-free.

Complete unit includes 10' cord and switch with thermal overload protection.

Among many Viberlec advantages are included:

- Practically silent operation—little or no annoyance to employees.
- Operating parts, sealed in steel, are *not* affected by dust, moisture, water, humidity, corrosive or contaminated air.
- Vibrated material may be hot or cold, under pressure, vacuum or controlled humidity. It may be sterile, toxic or protected by an inert atmosphere.
- Quick change mounting plate permits multiple use of vibrator.
- Ruggedly constructed for years of reliable service.

For literature and detailed information write **VIBER COMPANY**,  
726 South Flower Street, Burbank 57, California.



## VIBRATORS

Pioneers and leaders in the manufacture of vibrators

Check 4695 opposite last page

## HANDLING & PACKAGING

cilitates application of the technique known as "management by exception." Executive attention is not devoted to the review of routine operations, but is focused on the unusual situation before it reaches the critical stage.

### Equipment

An efficient distribution system must be equipped with the proper tools to operate at the lowest overall cost to both supplier and customer. Fortunately, advances in equipment design have kept pace with changes in packaging, warehousing, and transporting operations.

Through improved truck design, many operations previously performed with pallets are now being accomplished without them. Where pallets are required, mechanical loading and unloading equipment may be used. Driverless trucks are available for warehousing operations. High-capacity, high-lift industrial trucks are available for unloading and handling bulk containers. These and other equipment developments must be given careful consideration in engineering an efficient product distribution system.

### Economics

Economic evaluations compare investment and operating costs for a number of alternate systems. This is the yardstick by which each IPD system must be measured.

A correctly engineered system considers the customer's need using the "systems" philosophy. His operating practices and his facilities for unloading, handling, storing, and container discharging must be included in this systems analysis.

In summary, looking at product distribution from a "systems approach" viewpoint, we find four engineering fields which must be considered: material handling, packaging, warehousing, and transportation. A thorough engineering and economic analysis of all factors in each of these fields provides an integrated approach to product distribution.



**YOUR  
OPINIONS —**

— and comments on the significant subjects carried in each month's **CHEMICAL PROCESSING** are important! We welcome your letters expressing your views.

Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in **CHEMICAL PROCESSING** others will have the opportunity to hear your side.

**Perhaps you agree**

with what has been written in these articles.

**Maybe you don't.**

You might even have a thought or angle which wasn't expressed.

If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 8.)

Address your comments to:  
The Editor  
**CHEMICAL  
PROCESSING**  
111 E. Delaware  
Place Chicago  
11, Illinois

For more information on product at right, specify 4696 see information request blank opposite last page.



# GAYLORD ACCEPTS YOUR TOUGHEST PACKAGING CHALLENGE

On guard against the profit squeeze? Too much product protection? Too little? Too many interruptions on automated packaging lines? Gaylord men can help you check these points — and more. They have developed a special skill in scoring packaging successes with corrugated . . . against the toughest challenges.

Whether you need regular cartons by the thousands or engineered packaging, call your nearby Gaylord man.



## GAYLORD

CONTAINER CORPORATION



HEADQUARTERS, ST. LOUIS  
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**



Triple effect, falling-film  
type evaporator operating on heat  
pump principle . . .

## concentrates heat sensitives at temperatures below 100°F

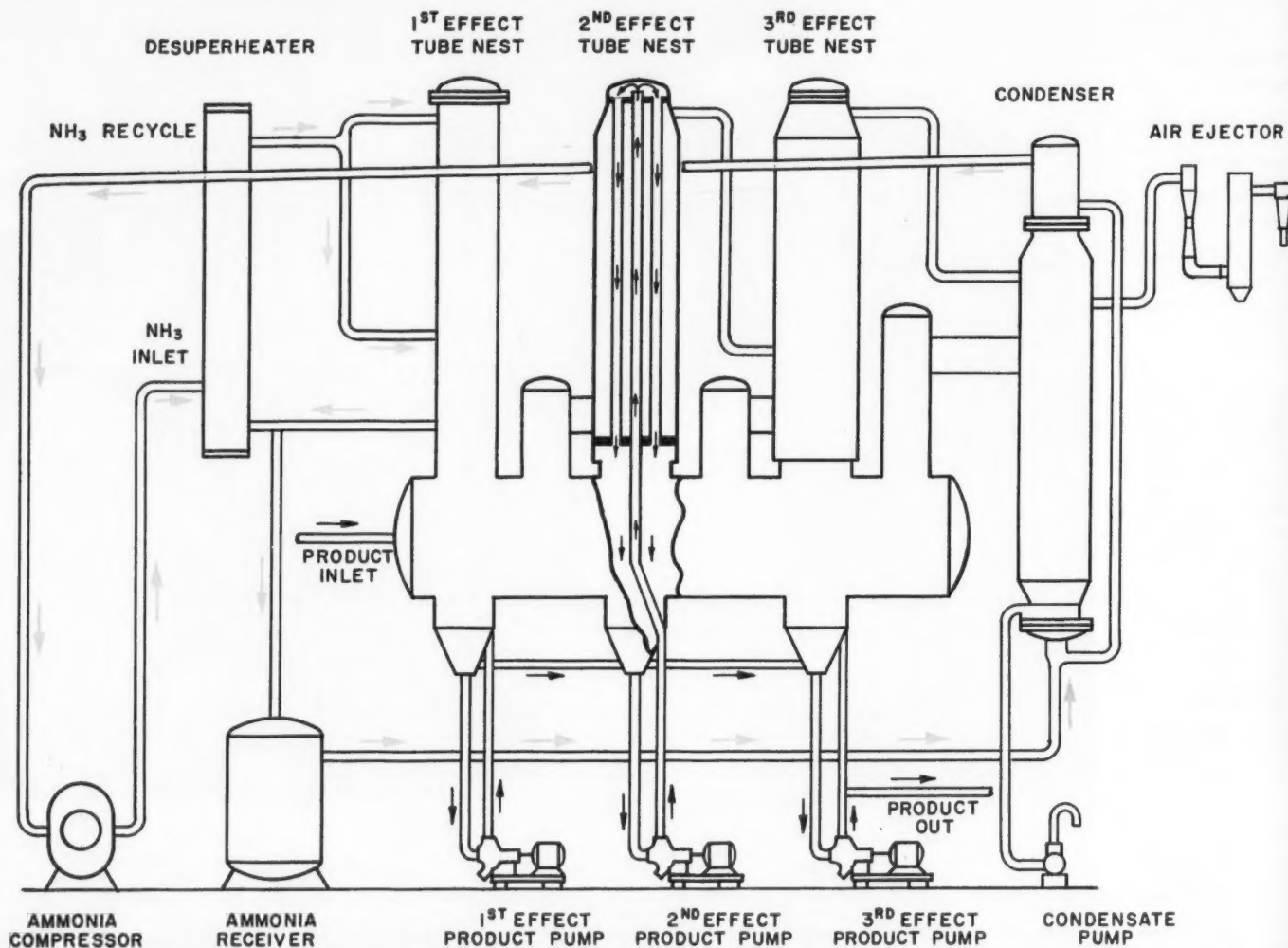
Can process up to  
30,000 lb per hr; uses  
compressed ammonia  
vapor for heating instead  
of steam

**Uses:** Concentrating heat-sensitive chemical solutions. Recovering solvents such as acetone, chloroform, alcohol, pyridine, etc.

**Features:** Triple-effect, falling-film type evaporator uses compressed ammonia vapor for heating instead of steam, resulting in low operating temperatures.

Evaporation temperature never exceeds 100°F. Only negligible amount of water is used, being needed for control purposes only. Power requirements are low—75-hp electrical energy will evaporate 5000 lb product. Large unit can evaporate up to 30,000 lb material per hr.

**Description:** Single- and double-effect units produced in the past have been highly successful in the food field, evaporating milk and other liquid food products. Triple-effect evaporator is specifically designed for chemical applications.



Triple-effect evaporator operates without use of steam. Power is needed only to run ammonia compressor and recirculating pumps. Simplified cut-away illustrates flow of material through second effect. Colored arrows show flow of ammonia

Units operate on heat pump principle and can be pictured as being an ordinary refrigerator in reverse. Power is needed only to operate the ammonia compressor and circulating pumps.

All three effects function under vacuum—first being at 49.10 mm, second at 36.10 mm, and third at 26.25 mm. Each effect consists of a 42"-OD x 20' chamber containing over 200 1"-diam x 20' stainless tubes. Vacuum is obtained by means of an air ejector. A 75-hp compressor is used to boost low-pressure ammonia to 225 psi.

In operation, recycled ammonia at 108°F, from desuperheater, is forced into the first effect at 225 psi. Solution being processed flows down the tubes which are surrounded by ammonia vapor. Water evaporates from the solution at 99°F. Ammonia vapor gives off latent heat to the solution, changes to a liquid at 108°F, and is piped to a receiver.

Water vapor from first effect is sent to second effect where it performs same function as ammonia vapor did in first effect. The solution from first effect enters second effect at bottom and is pumped to top of chamber. As in the previous effect it flows down through the nest of tubes. Water flashes from the solution at 87°F.

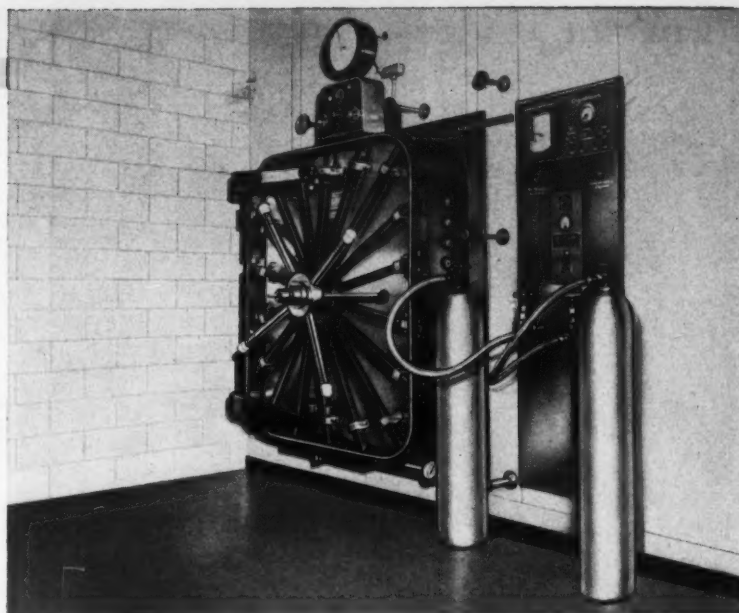
Process is again repeated in third stage, with water evaporating at 75°F. Concentrated product is withdrawn from final effect, ready for use or further processing.

The 75°F water vapor leaving the final stage is sent to a vertical condenser where it comes in contact with over 400 1"x20' steel tubes containing liquid ammonia at 70°F. Vapor condenses and water is discharged from the system. The low-pressure ammonia is recycled back to the compressor, ready for reuse in the system. Evaporators can operate continuously with only minimum attention.

(Triple-effect Lo-Temp evaporators are product of Mojonier Bros. Co., 4601 West Ohio Street, Chicago 44, Illinois.)

Check 4697 opposite last page.

## Looking for authoritative answers on Ethylene Oxide Sterilization of Heat- and Moisture- Sensitive materials?



American Sterilizer installation of large rectangular autoclave with automatic control for carboxide gas sterilization of heat- and moisture-sensitive materials. Routine sterilization with pressure steam is also accomplished automatically in this unit. Other equipment available ranges from the 16"x16"x30" self contained Cry-O-Therm to 60"x66"x120" single- or double-door models.

### WHY ETHYLENE OXIDE?

As long as ten years ago, American Sterilizer researchers settled upon Ethylene Oxide (inerted with suitable diluents) as the agent of choice for the rapid and dependable sterilization of heat- or moisture-sensitive materials. Advances in such varied fields as pharmaceuticals, surgical supplies and packaging have greatly broadened the range of applications for which this versatile sterilizing agent is recommended. But they have also clearly signaled the need for a precise relationship between such factors as temperature, humidity, pressure, exposure, concentration and diluents in effecting optimum conditions for each specific application.

### WHY AMERICAN STERILIZER?

Our ten year study of the characteristics of Ethylene Oxide has been paralleled by an equally thorough development of instrumentation. As a result, American Sterilizer techniques and installations are successfully serving an ever-widening range of industrial and commercial processes requiring the sterilization of heat- and moisture-sensitive materials.

Because we have accumulated the largest body of data and experience in this field, we can advise you authoritatively. Because we offer the broadest range of automatic equipment for standard or special application you enjoy significant benefits of economy and continuing efficiency.

### SEND FOR THIS FREE BASIC LITERATURE

Basic literature on "Ethylene Oxide Sterilization for Industry" is available upon request. Engineers of our Scientific Division are "on call" for consultation on processes, techniques or packaging and Experimental and Pilot Plant facilities are available through our Research Division.

Write for Bulletin 1C-602



**AMERICAN  
STERILIZER**

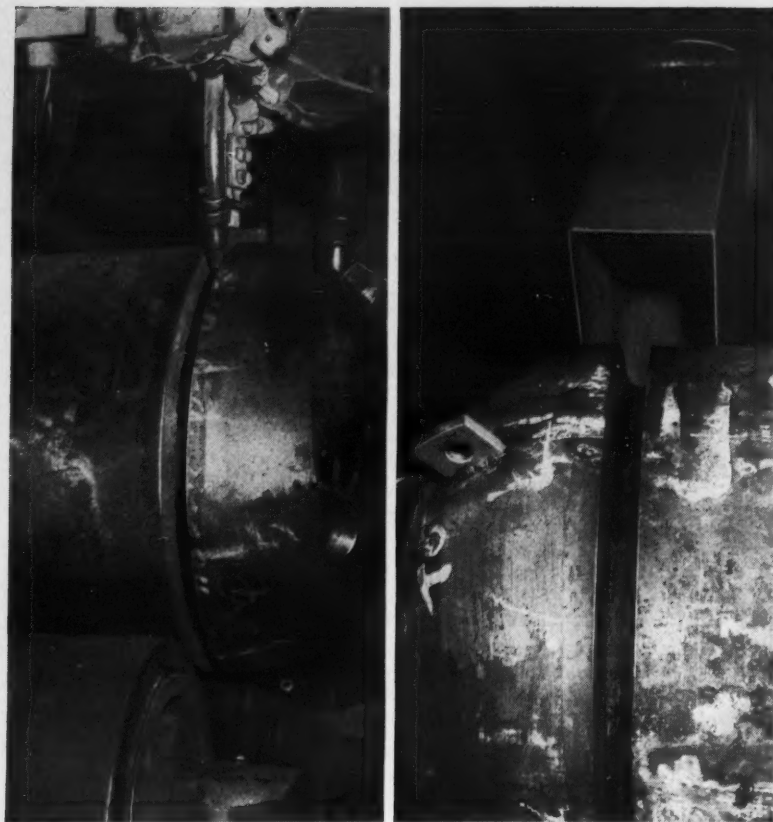
ERIE • PENNSYLVANIA

Scientific Division



Check 4698 opposite last page





**WELDING...**

**X-RAYING...**

## 2-inch-thick seam at Downingtown

Item: Air Dryer Cylinder

Material: Carbon Steel

Thickness: Head, 2"—Shell, 2-5/16"

Design Pressure: 3200 psi

Hydrostatic Test Pressure: 5400 psi

Design Temperature: 450° F.

Stamping: National Board and ASME

X-rayed and stress relieved. Inspection by purchaser and Hartford. One of 8 identical units. The rest of our plant equipment is geared to our capacity for welding 2-inch-thick material and lifting 80 tons. Write for bulletins; illustrating Downingtown equipment and experience.

### Downingtown Iron Works, Inc.

144 Wallace Ave., Downingtown, Pennsylvania

division of **PRESSED STEEL TANK COMPANY** Milwaukee  
Branch offices in principal cities

**HEAT EXCHANGERS—STEEL AND ALLOY PLATE FABRICATION**  
**CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS**



Check 4699 opposite last page

### PROCESSING

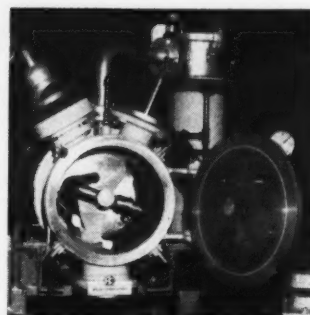
**Rotary vacuum dryer  
adaptable for heat  
or freeze drying**

Can be used for sterile or non-sterile applications

**Uses:** Drying various products in chemical industries.

**Features:** Units can operate under full vacuum and are completely jacketed for heat- or freeze-drying applications. They are adaptable for either sterile or non-sterile uses.

**Description:** Rotary vacuum dryers are horizontal, stationary-shell type, having a large charging nozzle, and special



Pilot plant model of dryer is available for test purposes

handwheel-operated discharge opening. Units can be constructed of stainless steel or other metals.

Two models are available. One, model 600D, has hinged door. Other unit, model 600C, is furnished with bolted, detachable cover. Pilot plant equipment is available.

(Rotary vacuum dryer was developed by Alloy Fabricators Div., Continental Copper and Steel Industries, Inc., 500 Market St., Perth Amboy, New Jersey.)

Check 4700 opposite last page.

### Details vibrating screen

Illustrated bulletin of four pages describes operating and construction features of vibrating motor screens and lists specifications. Vibrating screen bul — Derrick Manufacturing Co., 590 Duke Rd., Buffalo 25, N. Y.

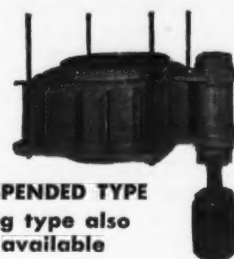
Check 4701 opposite last page.

**RID your product of  
IRON PARTICLES**  
with



### ELECTROMAGNETIC SEPARATORS

**FOR DRY MATERIALS**

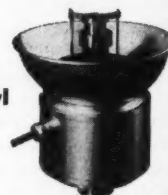


**SUSPENDED TYPE**  
Leg type also available

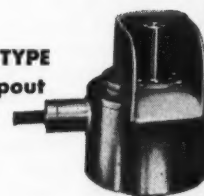
**FOR WET MATERIALS**



**PIPELINE TYPE**  
Fully enclosed  
for pipe sizes  
from 1" to 3"



**GRAVITY TYPE**  
with Open Bowl  
to receive  
liquids



**UNDERFEED TYPE**  
with Open Spout  
to discharge  
liquids

For Complete Information  
Send for **BULLETIN 46-E**

### S. G. FRANTZ CO., Inc.

Brunswick Pike & Kline Ave.  
P. O. Box 1138 Trenton 6, N. J.

Check 4702 opposite last page

CHEMICAL PROCESSING

## ARE YOU LOOKING . . .

for more information on any of the products or services mentioned in this issue of **CHEMICAL PROCESSING**?

Then make use of the Reader Service slip opposite the last page of this issue.

## It's easy . . .

to use and can save time. Every month you will find a number at the end of each article or advertisement. Find this number on the slip and check it.

If several items from the same manufacturer are listed in the story just write the item down in the space provided on the Reader Service slip. Don't forget to include the key number.

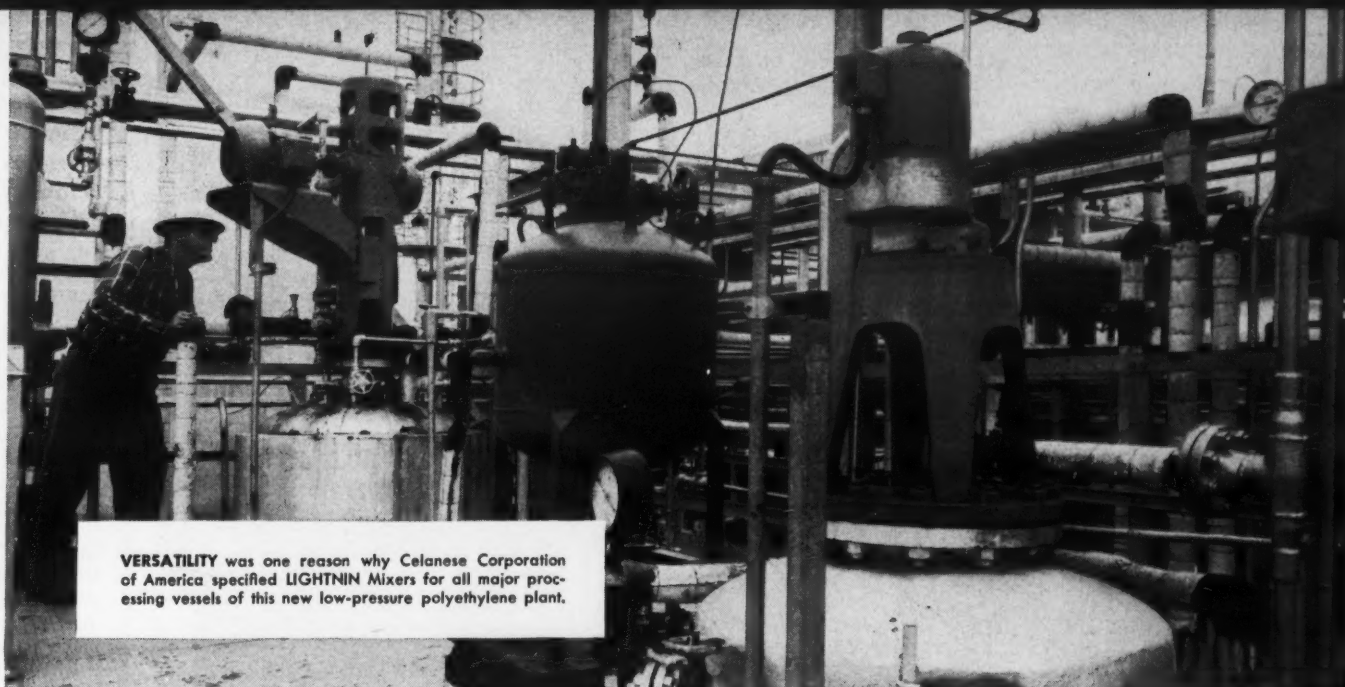
Then fill out the slip and mail it to Reader Service Department. We will contact the manufacturer for you.

Additional details will be sent direct to you.

## Be sure . . .

to fill in the slip with the other pertinent information: your name, title, company, product made, and address.

For more information on product at right, specify 4703 see information request blank opposite last page.



**VERSATILITY** was one reason why Celanese Corporation of America specified **LIGHTNIN Mixers** for all major processing vessels of this new low-pressure polyethylene plant.

## Why Celanese chose these mixers for low-pressure polyethylene

How can mechanical mixers help you give the touch of success to an important new process?

Celanese Corporation of America faced this question when its Plastics Division designed a plant to produce 100,000 lbs./day of Fortiflex® low-pressure polyethylene.

### Needed: special answers

"We looked for a mixer supplier who could provide special features required by our process," says Lonnie C. Cunningham, chief engineer at the new Celanese plant, Pasadena, Texas. "MIXCO engineers came up with a design that solves these mixing problems for us:

"1. The mixers had to be *versatile*, since they must suspend solids in liquids over a wide range of operating temperatures. MIXCO's experience in our field and similar ones gave us confidence that their design would

stand up in actual performance.

### "No stoppage"

"2. *Efficiency* of the mixers means much to us, because any stoppage in our continuous process may cause troublesome settling and hardening of material in the tanks. The durable construction of **LIGHTNIN Mixers** is important in maintaining uninterrupted flow.

"3. Another factor in keeping this process onstream continuously is the **LIGHTNIN mechanical seal** on some of our pressure units. This seal prevents leakage, and requires practically no maintenance. When necessary, we can change the seal quickly *without dismantling the mixer*, without loss of product and without pulling specially skilled men off other jobs.

"4. Finally, MIXCO's price was competitive—even though their bid was not the lowest."

### Getting the edge

You can give *your* new process economic advantages like these by calling in **MIXCO** at an early stage.

*You get onstream faster* because **MIXCO** can build the special-purpose mixers you need, using *standard stock components*.

*You know you're right* because your **LIGHTNIN Mixers** are designed on the basis of unique fluid mixing experience and technology . . . and backed by a guarantee of successful results.

*You trim operating costs* with mixer features like the **LIGHTNIN mechanical seal**, flex-protected gearing, and many others.

To see how you can get this efficient kind of mixing for your process, talk to your **LIGHTNIN Mixer** representative (you'll find him listed in Chemical Engineering Catalog). Or write us direct.

## ***Lightnin® Mixers***

**MIXCO fluid mixing specialists**

**MECHANICAL SEAL** on this turbine-type **LIGHTNIN Mixer** at Celanese can be replaced in minutes without dismantling mixer and without special skill.

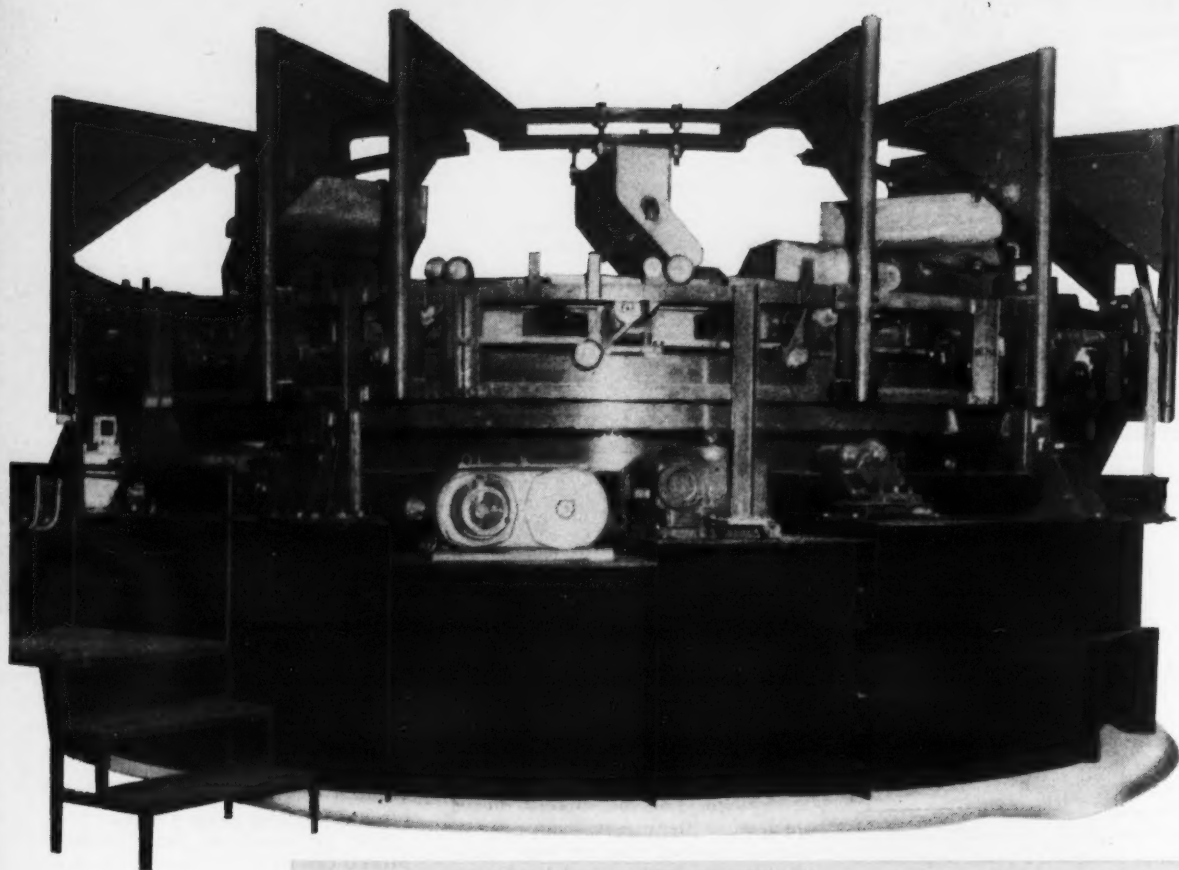
**WHAT MIXING OPERATIONS** are important to you? You'll find a wealth of information on fluid mixing in these helpful bulletins describing **LIGHTNIN Mixers**:

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Top or bottom entering; turbine, paddle, and propeller types: 1 to 500 HP (B-102) | <input type="checkbox"/> Side entering: 1 to 25 HP (B-104)                   | <input type="checkbox"/> Quick-change rotary mechanical seals for pressure and vacuum mixing (B-111) |
| <input type="checkbox"/> Top entering; propeller types: ¼ to 3 HP (B-103)                                  | <input type="checkbox"/> Laboratory and small-batch production types (B-112) | <input type="checkbox"/> Confidential data sheet for figuring your mixer requirements (B-107)        |
| <input type="checkbox"/> Portable: ¼ to 3 HP (B-108)   | <input type="checkbox"/> Condensed catalog showing all types (B-109)         |  |

Check, clip and mail with your name, title, company address to:

**MIXING EQUIPMENT Co., Inc.**, 185-d Mt. Road Blvd., Rochester 11, N.Y.  
In Canada: **Greay Mixing Equipment, Ltd.**, 100 Miranda Ave., Toronto 10, Ont.





This is another successful Eimco Pan Filter installation, saving its owner the investment every year.

## EIMCO PAN TYPE FILTERS FOR ACCURATE WASH CONTROL

Eimco Pan Type Filters are essential for horizontal filter operation where:

1. Complete discharge is desired
2. Accurate wash control is recommended
3. Clean, washed filter media is required
4. High production is necessary
5. Quality product is a must

Each pan is essentially a filter unit in itself. Eimco designs provide for sizes from 20 to 500

square feet of filter area with custom features depending on the products to be filtered. Such items as feed stations, materials of construction, filter medium, wash stations, media washing and many other variations are supplied when customers process people meet with Eimco engineers to establish critical specifications.

Filtration problems are best solved by filtration specialists . . . Write Eimco.

## THE EIMCO CORPORATION

SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois.

Process Engineers Inc. Division, San Mateo, California

Expert Offices: Eimco Building, 51-52 South Street, New York 5, N. Y.  
BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD



B-317

### PROCESSING

#### **Filter cake removed in matter of seconds with vibrator**

Unit can be used on large pressure-leaf filters

**Uses:** Automatically removing filter cake from leaves in pressure-leaf filters.

**Features:** Vibrating device removes cake from leaves in matter of seconds. Unit can be installed on filters with 100 to 1000 sq ft filter area.

**Description:** Cleaning device consists of an eccentric-type electric vibrator, which can be attached to a yoke that transmits the vibrations to the leaf pack tie rods.

In recent test, a 3/7-to 1/2"-thick cake consisting of about 20% nickel catalysts, 55% diatomaceous earth, and 25% residual hydrogenated oil, the entire cake was removed from a large seven-leaf filter in 7-10 seconds. A considerable harder, more difficult-to-remove cake was freed in 30 seconds.

(Vibrators are product of Hercules Filter Corporation, 175 Ethyl Avenue, Hawthorne, New Jersey.)

Check 4705 opposite last page.

#### **Starch cooked instantly in continuous unit**

Operates automatically, can also handle dextrans, gums

**Uses:** Cooking starch continuously in paper, textile, food, and other fields. Cooker will also handle dextrans, gums, and similar materials.

**Features:** Unit cooks starch fast and efficiently. Standard model, using 3/4" pipe, handles heavy starch mixes at rate of 250 gph. Cooker is completely self-contained and runs automatically.

Although designed to operate continuously, unit can be set to run intermittently when less than its capacity is required for any interval of time.

**Description:** Cooker operates at any selected steam pressure between 25 and 75 psi. Cooking is done with live steam at

Check 4704 opposite last page



## PROCESSING

temperatures above 212°F. Product is retained in 12-gal-lon externally heated tank until ready for use. Tank is kept at 5 to 25 psi, as desired.

Size of cooker is such that it can be conveniently located



Compact unit delivers cooked starch instantly and only in the quantity required at any given time

next to point of use, making cooked material available almost instantly, and only in the quantity required at any given time.

To clean unit, it is only necessary to substitute tap water for material being processed.

(Nemo jet cooker is product of Nemo Industries, Inc., 3081 Maple Drive, N. E., Atlanta 5, Georgia.)

Check 4706 opposite last page.

### FOR MORE INFORMATION

Here's what to do when you want additional details about products and services mentioned in this issue's editorial articles or advertisements.

Note the number at end of article or advertisement. Check this key number on Reader Service Slip opposite last page of this issue. Fill in Slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you. He'll send you the details direct.



Aerial view of St. Regis Paper Company's new Jacksonville plant.



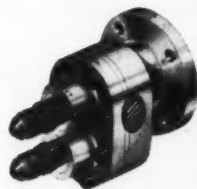
CENTRIFUGAL PUMPS

## handled by standard EASTERN CENTRIFUGAL PUMPS

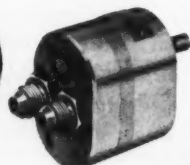
St. Regis' paper process uses standard Eastern Centrifugal Pumps to deliver sulphuric acid through lines into pulp storage chests. Varying amounts of acid control the pH of the pulp to obtain the proper setting of the sizing material and the correct acidity in the finished sheet of paper. An automatic pH controller instrument regulates an automatic valve to govern pump flow.

In every detail of size, weight, power, and cost, Eastern Pumps fill the bill for meeting special process conditions. Job-rated Eastern Centrifugals are available in 18-8 type 303, and type 316 stainless steel, Monel, Hastelloy "C", cast iron, and bronze alloys. Powered by 1/8th to 3/4 H.P. induction motors with capacities up to 70 G.P.M., pressures to 65 P.S.I., six standard close-coupled models meet a variety of service and operating conditions.

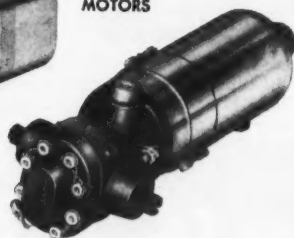
Whether for process requirements, or new equipment designs, look to Eastern for standard pumps that handle *unusual* requirements.



HYDRAULIC PUMPS



FLUID MOTORS



AIRCRAFT-TYPE PUMPS

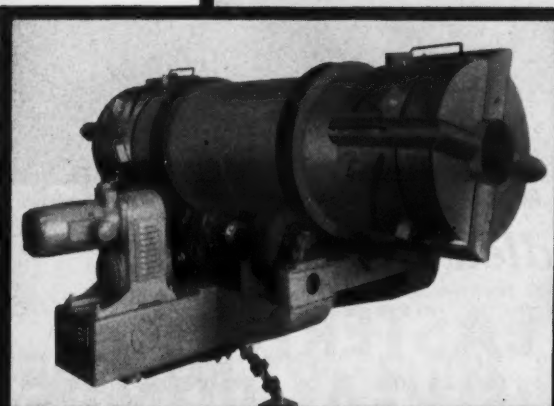
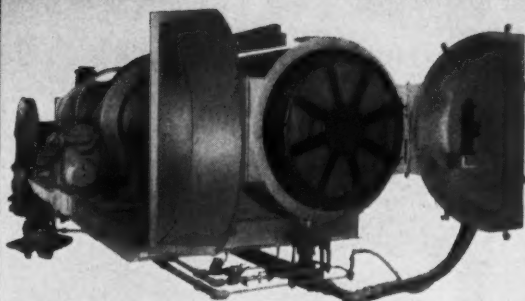


For easy reference and helpful data, write for Bulletin 120-S.

Check 4707 opposite last page

# RENNEBURG PROCESS EQUIPMENT for the Chemical Industry

Special  
Renneburg  
gas-fired  
indirectly-heated  
stainless steel  
Batch Dryer  
for calcining  
Urea product.



Renneburg  
Rotating Batch  
Reactor for  
starch-dextrine  
material. Has  
quick-opening  
ends, rubber tire  
drive and  
hydraulic tilting  
mechanism.

SERVING THE  
PROCESS  
INDUSTRIES FOR  
OVER 80 YEARS



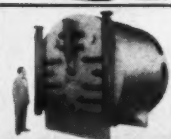
DRYERS  
(Air & Steam)



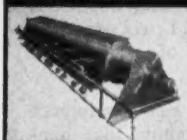
COOLERS



COMBINATION AMMONIATOR-GRANULATORS



FURNACES



COOKERS



REACTORS



PRESSES



PILOT PLANTS

KILNS • COMBUSTION EQUIPMENT • CALCINERS • FANS • COLLECTORS  
AIR POLLUTION CONTROL SYSTEMS • AMMONIATORS\* • GRANULATORS\*  
PUG MILLS • EVAPORATORS • MIXERS • ELEVATORS • CONVEYORS • ROASTERS

\*TVA Licensed Manufacturer

Literature and information on request

## Edw. Renneburg & Sons Co.

2639 BOSTON STREET, BALTIMORE 24, MD.

Check 4708 opposite last page

## PROCESSING

**New rotary kiln design  
simplifies installation,  
reduces costs**

Integrated sealed power unit  
eliminates concrete pier

Rotary kiln has been developed that simplifies foundation plans, cuts torque and power load, and reduces maintenance. Big change from conventional kilns is the power unit. This has been integrated and placed in a sealed enclosure, resulting in the elimination of one concrete foundation pier.

All kiln trunnion and thrust rollers have been linked to girth gears, cancelling out dependence on friction to move rollers. Through such linkage, all rotating parts are synchronized to rotate simultaneously without slippage.

Because mountings are enclosed and trunnion and thrust rollers are not friction driven, gear teeth and bearing surfaces can be lubricated by forced oil feed. Frictional wear between tire and trunnion rollers is thereby practically eliminated, greatly increasing life of these elements.

The oil serves both as lubricant and heat exchange medium to further control wear, reduce mechanical shutdowns, and cut torque due to friction. Heavy castings have been replaced with strong lightweight fabricated parts machined to close tolerances.

(Rotary kiln was designed by Vulcan Iron Works, PO Box 570, Wilkes-Barre, Pa.)

Check 4709 opposite last page.

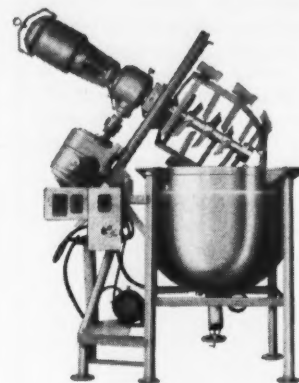
**Insert gas generators  
are fully automatic,  
packaged units**

Produce from 500 to 25,000  
cfh by burning fuel gas

Uses: Producing inert gas from fuel gas for blanketing and purging operations, valve seating, or as bubbling and agitating agent.

Features: Standard size package units can produce

This typical G-W Eppenbach Agi-Mixer is fully jacketed. Hydraulic lift raises mixing assembly. Contact parts are stainless steel.



**only Agi-Mixers give  
HOMOGENIZING  
PADDLE MIXING  
at the same time!**

...That's why hundreds of users have found G-W Eppenbach Agi-Mixers just about the most useful processing equipment they possess.

Rotating paddles with teflon scraper blades work unrefined material down from the edges and top of the kettle to the high-speed, high shear Homo-Mixer homogenizing head. Here the material is drawn through small clearances between a precision turbine and stator, and ejected upward against an adjustable deflector plate. At this point the paddles again direct the material down, and this cycle is repeated until the entire mass is properly homogenized and blended.

G-W Eppenbach Agi-Mixers are built for rugged, exacting, time-saving service, and have scores of uses in processing pastes, creams, batters, slurries, gums, adhesives, pigments, resinous and latex compounds, and other viscous products. 3810

Use coupon for free 24-page Fact Book describing the whole unusual Eppenbach line.

**GIFFORD-WOOD Co.**

Eppenbach Div., Dept. CP-4  
Hudson, New York

Please send me your free Eppenbach  
Fact Book.

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_

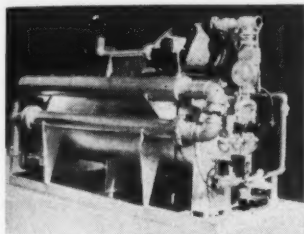
Check 4710 opposite last page

CHEMICAL PROCESSING

## PROCESSING

from 500 to 25,000 cfh. Generators operate completely automatic and require only minimum maintenance and attention.

**Description:** Exothermic gas generators are designed to produce inert gas efficiently by burning fuel gas under controlled conditions.



Packaged unit is designed to produce low-cost inert gas

Units are firebrick-lined and have water-jacketed combustion chamber. They are equipped with all necessary safety and control devices for safe, accurate operation.

When operating on natural gas, products of combustion have following approximate percentage composition:

CO <sub>2</sub>	11.5
N <sub>2</sub> and inerts	87.1
O <sub>2</sub>	0.0
H <sub>2</sub>	0.7
CO	0.7

Generators can be installed in any plant having fuel, water, and electricity available in the following requirements based on needs for each 1000 cfh capacity: Fuel, 110 cfh based on 1000 Btu gas; electricity, 1 kw-hr/hr; water, 275 gph at 30 psi and minimum temperature of 75°F.

(Exothermic gas generators are product of A. A. Straub Company, Inc., 4930 Grayton Road, Cleveland, Ohio.)

Check 4711 opposite last page.

### Micronic filters

Manufacturer's catalog describes and illustrates filtration equipment for micronic clarification of fluids. Micronic filter cat — Commercial Filters Corp., 2 Main St., Melrose, Mass.

Check 4712 opposite last page.



## **"B&W Tubing cuts fabrication and installation time in process industry"**

Modern processing plants often require special tubing installations. Sometimes it is an unusual tubing length which is required . . . or, perhaps severe corrosion or erosion conditions are the problem. Whatever the case may be, B&W is geared to handle it. For example . . .

A large processing unit needed unusually long length (over 80 feet) stainless steel tubing 8 5/8" OD, 3/8" wall. Buying random lengths, and welding in the field, involved fabricating problems and loss of material. B&W met the problem — for it has facilities to center-weld, hydrostatically test the full length tube, boroscope the weld area, X-ray examine the weld and furnish a proved cut length. *This simplified procurement problems and reduced fabrication and installation time.*

B&W can do the same for you. When you have a tubing problem, call Mr. Tubes, your nearby B&W sales representative — he can help you solve tubing problems. Write for Bulletin TB-417. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.



TA-8017-PP2

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals.

Check 4713 opposite last page

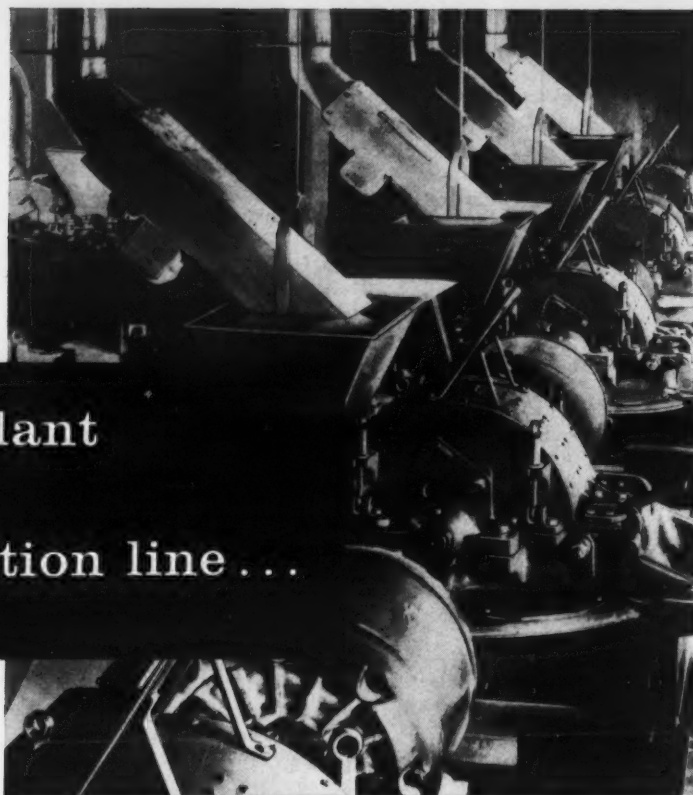


A Battery of No. 4TH Mikro-Pulverizers . . . 50 hp. motors . . . capacities to 25,000 lbs. per hour.



The Bantam Pulverizer — a complete miniature grinding mill with  $\frac{3}{4}$  or 1 hp. motor. Bulletin #51A

pilot plant  
to  
production line . . .



## There's A MIKRO-PULVERIZER For Every Grinding Job!

Throughout the processing industries—wherever materials are ground to exacting specifications—Mikro-Pulverizers are at work. Among these units are miniature mills for product development . . . ultra-high capacity mills producing more than ten tons per hour . . . or any of a complete range of intermediate sizes. Each unit is adaptable to a wide variety of special conditions and requirements, to produce the best results possible on specific applications.

In addition, the quality and fineness of grind specified for your product can be exactly duplicated on any Mikro-Pulverizer, allowing you to predict results in advance.

Let us show you what you can expect from a Mikro-Pulverizer. Send us a sample of your product. *We'll grind it at no cost to you . . . and make recommendations that can put more profit in your production.*

GENUINE MIKRO-D REPLACEMENT PARTS AVAILABLE FROM LARGE STOCK WITHIN 48 HOURS.

# Mikro-D

## PULVERIZING MACHINERY DIVISION

METALS DISINTEGRATING COMPANY, INC.  
60 Chatham Rd. Summit, N. J.

Check 4714 opposite last page

### PROCESSING

**Fast bottom discharge,  
mid-point suspension,  
on batch centrifugal**

Unit has automatic timer controls for all operations

**Uses:** Removing solids from various liquids and suspensions in chemical and allied industries.

**Features:** Fully automatic timer-controlled batch-type centrifuge combines fast bottom discharge with load-centering mid-point suspension. Unlimited variations in batch programming are possible, and all sequences are exactly repeated unless controls are re-set.

**Description:** Centrifuge is operated by two-circuit control panel using 7 Microflex timers. All operations can be performed at either medium or maximum speeds, or can be selectively varied so that some are carried out at medium speeds, others at top speed.

Unloading, started and timed automatically, is done by means of a hydraulically operated plow that shaves solids into granular form for fast discharge through 28 or 30" bottom opening.

Centrifugals are available in basket diameters of 40 and 48". Mounting is designed so that all points of suspension are in a line that passes through center of gravity of basket and its contents. This permits unit to process out-of-balance loads safely, with only minimum stress on bearings.

(Batch-O-Matic centrifugal is product of American Machine and Metals, Inc., Tolhurst Division, East Moline, Illinois.)

Check 4715 opposite last page.

### Heat exchanger specs

Specifications of 46 one-, two-, and four-pass heat exchangers are contained in eight-page bulletin. Literature covers expanded line of compact, versatile units. Bul 1.1K6 — Ross Heat Exchanger Div., American-Standard, Buffalo 5, N. Y.

Check 4716 opposite last page.

## WOULD YOU?

Would you like to receive a copy of **CHEMICAL PROCESSING** every month?

You know it will be sent to you free of charge.

If you would like to receive it and if you qualify, the publisher will add your name to the more than 50,000 key men in the chemical processing industries who receive each issue regularly.

Thus, the magazine will come to you personally, without charge, every month, to your designated address.

The necessary qualifications are outlined on the request form that can be found opposite the inside back cover.

Fill it out, being sure to give all necessary information, and mail to Reader Service Department.

If...

others in your company would like also to receive **CHEMICAL PROCESSING** personally each month, they may be added to the form opposite the back cover.

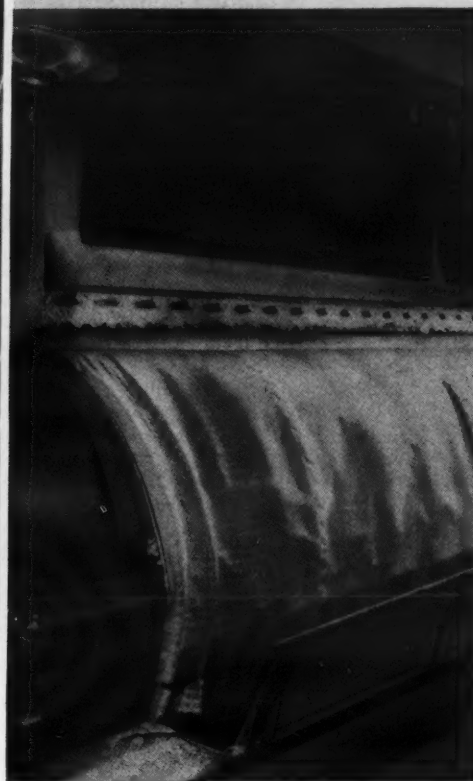
Your application for subscription is welcomed.

For more information on product at right, specify 4717 see information request blank opposite last page.



Molten materials, often repelled by smooth drum surfaces, are successfully handled on grooved drums.

Pastes and sludges of varying viscosities are handled rapidly and economically by continuous drum drying.



Heavy or dilute liquids respond well when dried on equipment specifically designed for the process.

## How Buflovak Drum Dryers are tailored to improve your product . . . boost your profits

Whether you need a single drum dryer to handle simple solutions at low cost . . . an enclosed drum dryer to process toxic materials . . . a double drum vacuum dryer to protect heat-sensitive liquids, Buflovak builds the dryer to best meet your needs.

Five different types of drum dryers are just part of a complete line that includes atmospheric and vacuum types, with chamber, pan, rotary, spray and other models.

Backed by this complete line, Buflovak experienced engineers can *impartially* recommend the unit that meets known specifications . . . fulfills the requirements of individual product testing.

Select your dryer scientifically at the Buflovak Customer Service Laboratory

An extensive line of small scale and pilot-size equipment is at your service for investigating drying, evaporation, extraction, impregnation and crystallization problems. Here you obtain accurate data and actual samples of your processed product, examine operation efficiency . . . thoroughly explore by-product possibilities.

Catalog 380 describes the Buflovak Dryer line; Catalog 381 fully describes Buflovak's lab. Both are available at your request. Additional facts also available in C. E. Catalog, pages 429 to 452.



**BLAW-KNOX COMPANY**

Buflovak Equipment Division  
1645 Fillmore Avenue, Buffalo 11, New York

**Dry and paste mixers**

Various types of mixers for handling dry and paste products are described in 22-page catalog. Illustrated with over 45 photos, literature contains operating and design information for such units as spiral blade mixers, mass and paste mixers, double cone blenders, and horizontal and vertical mixing mills. Catalog V-1 — Paul O. Abbe' Inc., 145 Center Avenue, Little Falls, New Jersey.

Check 4718 opposite last page.

**Dry pulverized materials blended efficiently by air system**

Cuts deviations in unblended components to  $\pm 0.2\%$

**Uses:** Blending dry bulk pulverized materials. System is suitable for either batch or continuous operation.

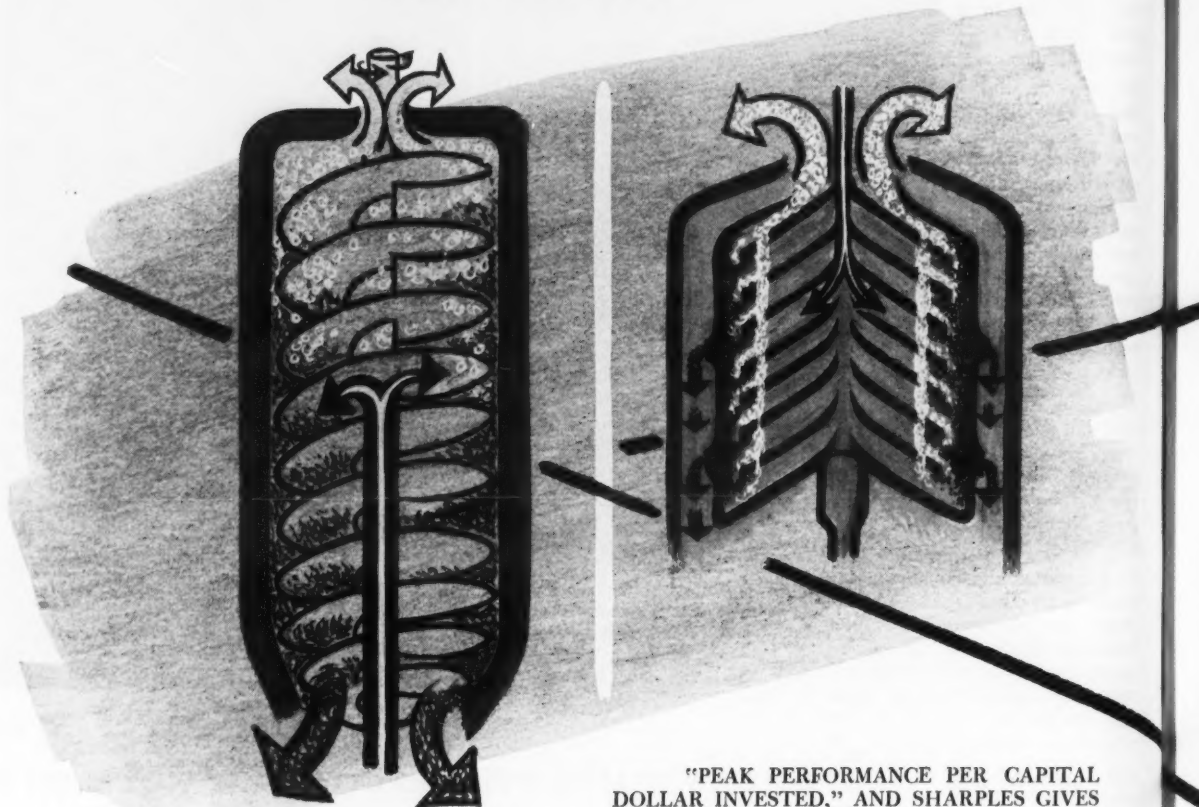
**Features:** System reduces deviations in unblended components down to plus or minus 0.2 percent. It is capable of blending materials with different bulk densities and finenesses. System operates at high tonnage capacity resulting in low manhours of labor-per-ton and minimum power consumption.

**Description:** Known as Air-merge Quadrant Blending, method is basically an aeration system that can be used on any materials capable of being fluidized by compressed air.

**Components include:** 1) aeration units with air distribution pipes and headers, 2) motor-operated valves for admission of air to quadrants, 3) check valves and orifice assemblies for general aeration, 4) aeration supply unit, 5) blending air supply unit, 6) pulsing valve and power-driven oscillating drive, and 7) silo withdrawal valves and automatic control.

System uses a round silo having a substantially flat bottom covered with aeration units. These are closely placed to give uniform distribution of air and are faced with porous refractory block to re-

## The economics of solids dewatering ... for 1958



"PEAK PERFORMANCE PER CAPITAL DOLLAR INVESTED," AND SHARPLES GIVES YOU ALL THE ADVANTAGE ...

With two new advanced design centrifuges for dewatering and clarification at high capacity, Sharples helps you make the best choice of the most productive, most economical investment.

The DH-6 Nozjector has new built-in efficiencies never before achieved, plus tremendous capacity; and the P-7000 Vertical Super-D-Canter features important advantages of unique and timely value.

These are but two of the centrifuges that Sharples offers to blanket the requirements of the solids dewatering field ... Sharples alone can offer such a variety of types ... and sizes.

It will pay you to take a new look at the significant improvements now possible in the classical applications for which each of these types of centrifuge is best known, plus the new areas for profitable dewatering that are now being opened as the result of these advances in centrifugal engineering by Sharples.



**THE SHARPLES CORPORATION**  
2300 WESTMORELAND STREET • PHILADELPHIA 40, PENNSYLVANIA

NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • NEW ORLEANS  
SEATTLE • LOS ANGELES • SAN FRANCISCO • HOUSTON • ST. LOUIS • ATLANTA

Associated Companies and Representatives Throughout the World

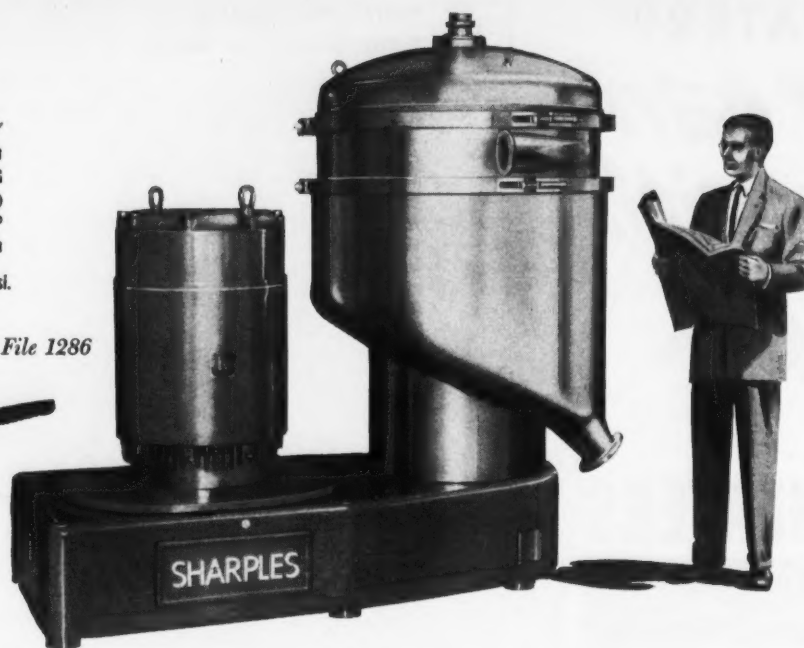


### The Sharples DH-6 Nozjector

Bowl Diameter	30"
Speed	To 3,000 rpm
Centrifugal Force	3,830 x G
No. of Nozzles	24 (double row)
Power	To 125 HP
Capacity	To 400 gpm

Models available to operate at pressures to 150 psi.

Write for Sharples Data File 1286



lease air in innumerable fine jets.

Compressed air is applied to  $\frac{1}{4}$  section of silo bottom at a time, in a volume sufficient to fluidize the dry pulverized material above the individual section.

Material rises above level of adjacent three quadrants and flows out across them at rapid rate, running off at a slope of two to five degrees. At bottoms of temporarily inactive quadrants, a small amount of compressed air is being released — enough to make the material somewhat buoyant but without basically changing its unaerated density.

The rising column of expanded material in the actively aerated quadrant is thus partly surrounded with heavier material which tends to slump over into the active quadrant. Here it becomes aerated, expands, rises, and flows outward. A strong and continuous roll-over motion in a vertical circuit is obtained which results in intensive mixing.

Aeration is periodically switched from quadrant to quadrant. After one complete cycle all of the material is in motion. Two such cycles will generally result in completely blended material. Two or more silos are needed to make process continuous.

(Airmerge Quadrant Blending system is product of Fuller Company, subsidiary of General American Transportation Corp., Catasauqua, Pa.)

Check 4720 opposite last page.

### The only 1958 Model CENTRIFUGES

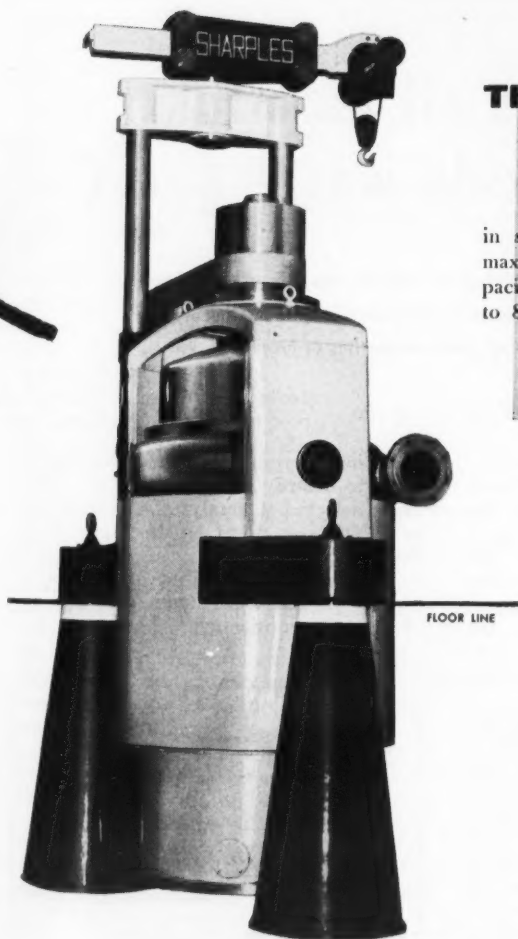
for dewatering, concentration and classification of solids in slurries, sludges, and suspensions... high capacity with maximum solids dryness, and for peak clarification at high capacity of process liquids containing from approximately  $\frac{1}{2}\%$  to 85% plus solids.

### The Sharples P-7000 Vertical Super-D-Canter

Bowl Size	30" dia. x 58"
Bowl Speed (max.)	2,000 rpm
Centrifugal Force (x G)	1700
Power (depending on service)	75-150 HP
Capacity:	upwards of 250 gpm Feed 10-12 Tons per hr. Solids

Models available to operate at pressures to 150 psi.

Write for Sharples Data File 1285



### Dryers, coolers, kilns

Comprehensive 68-page catalog contains detailed descriptions of dryers, coolers, calciners, and kilns. Technical and theoretical aspects of drying are covered. Ten equipment layouts show arrangements of heat processing and material handling facilities for processing wide variety of materials. Bul 118 — C. O. Bartlett & Snow Co., 6200 Harvard Ave., Cleveland 5, O.

Check 4721 opposite last page.

Check 4719 opposite last page

# GOT HOT WATER? *nothing can compare with* **Pick**

## HOT WATER HEATERS



**In hot water all  
the time!**

Flushing, purging, cleaning, adding hot water to formula, or furnishing hot water for showers, the PICK SYSTEM provides every control needed for continued, low cost, trouble-free operation.

**GET HOT WATER RIGHT—JUST WRITE**

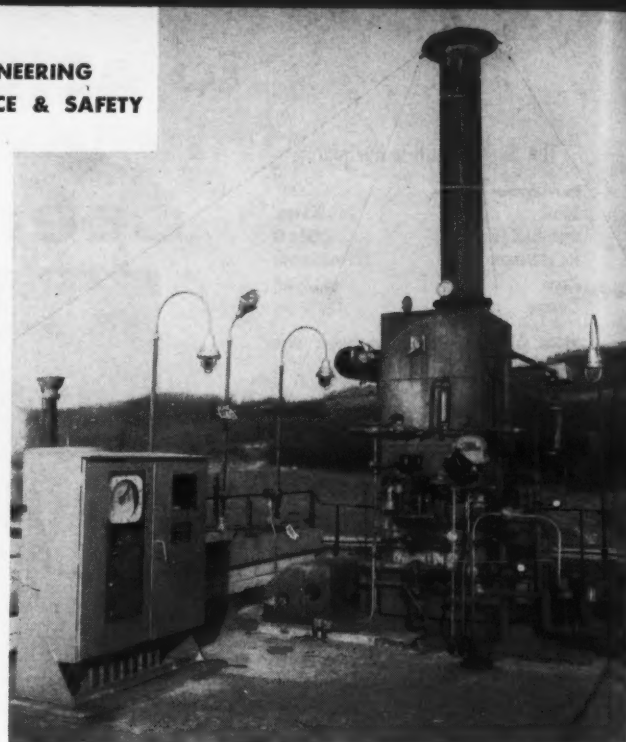
PICK MANUFACTURING CO., West Bend, Wisconsin

Check 4722 opposite last page.



**PLANT ENGINEERING  
MAINTENANCE & SAFETY**

Catalytic unit converts all corrosive and hazardous nitrogen oxide and nitric acid fumes from Koppers Co.'s niacin process to free nitrogen, carbon dioxide, and water vapor. Unit is operated entirely from control panel at left



## Destroys all harmful nitrogen oxide waste gases

Catalytic unit — the first of its kind — converts nitrogen oxides and nitric acid fumes to harmless free nitrogen and eliminates Kopper Co.'s air pollution worries at Arroyo, W. Va.

**Problem:** Release to atmosphere of approximately 250 lb per hour of gases, 50% of which contains mixture of nitrogen oxides and nitric acid, presents a health hazard to plant employees and neighbors and causes extensive corrosion to buildings and process equipment.

This gaseous waste is produced in the unique process used by Koppers Co., Inc. to manufacture niacin at their Arroyo, W. Va., plant.

Koppers had decided that it would not operate its plant so long as there was a possibility of toxic waste gases escaping into the atmosphere. A high stack might prevent pollution of immediate plant site, but atmospheric inversion conditions could cause concentrated gases to fall to ground level. Scrubbers or absorbers would require expensive neutralizing additives or rejuvenators, coupled with a secondary sewage disposal problem.

**Solution:** Early in the design stages of the new plant Koppers' Engineering

and Construction Div. considered various ways to destroy these highly toxic gases. They selected a catalytic reduction system that is as novel as the niacin process itself.

The system — the first of its type — breaks oxygen away from nitrogen oxides to "manufacture" harmless, free

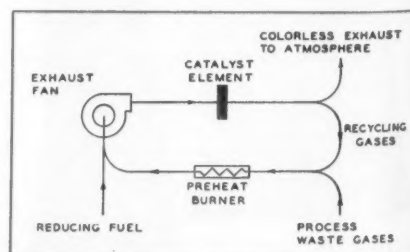


Diagram shows flow of gases through catalytic unit. Part of resulting clean, colorless gases are recycled to preheat incoming process gases

nitrogen.

Essentially, system consists of the flameless combustion of a hydrocarbon fuel with the oxygen being supplied by the oxides of nitrogen. The subsequent energy release is dissipated as high temperature exhaust gases which are used for preheating incoming fumes.

Catalyst structure has appearance of a metallic air filter. Thin, high-temperature resistant nickel-chromium ribbons are utilized as catalyst support media. Equally distributed, fixed in place and contained by screens of the same material, the ribbons provide a tremendous amount of available surface on which reaction occurs. Element is mounted in an alloy channel frame, 18 x 24 x 2½" thick, forming a strong one-piece unit.

Surfaces are coated, by a patented process, with a platinum alloy catalyst conditioned for maximum activity. Resultant catalyst bed has following properties: exceptionally low mass and thermal capacity, maximum available surface area in a minimum space, equal thermal expansion of the metallic catalyst and of support media to eliminate spalling, low pressure drop, unusual strength. It is impervious to thermal or mechanical shock.

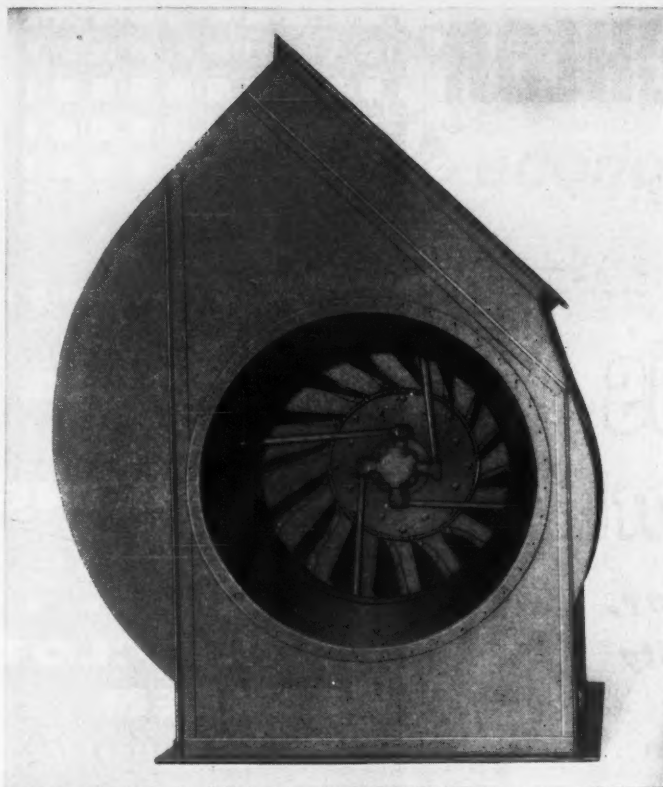
The element provides nearly instantaneous response to process changes, easily handling rapid fluctuations of temperature or load.

Entering process waste stream is diluted and preheated by hot recycled gases. It then passes preheat burner where, if required, any additional heating is accomplished. The reducing fuel, propane in this case, is added, and combined stream is drawn through catalyst element.

The fuel flamelessly combines with oxygen of the nitrogen oxides. Part of resulting stream is then recycled into system, while remaining clean, colorless gases, free of dangerous pollutants, are released into atmosphere.

Unit is fabricated with heat and corrosion resisting stain-

*To page 197*



**CORROSIVE  
GASES  
HANDLED WITH  
LESS MAINTENANCE  
LESS DOWNTIME**

**"BUFFALO"  
RUBBER-LINED  
FANS**

● **Longer Fan Life**—Proved in hundreds of installations over a period of more than 30 years, actual records show that up to 12 times the life of ordinary metal fans may be expected from "Buffalo" Rubber-Lined Fans in severe corrosive fume service. Thus you will spend very little time maintaining the "Buffalo" equipped system in your plant.

● **Economies effected in the reduction of downtime** are equally impressive. The overall savings of longer life plus decreased downtime pay the slight additional cost of rubber lining many times over. A fact executive management can readily appreciate.

The "Buffalo" method of rubber-lining assures permanence. The rubber is actually "welded" into the pores of the metal with a union that is practically integral. With the "Buffalo"

Rubber-Lined Fan, corrosive fumes cannot touch metal—the inside of housing, rotor and shaft are completely rubber-protected.

Whatever your corrosive fume handling problem, your nearby "Buffalo" Engineering Representative will recommend the type of "Buffalo" Rubber-Lined Fan best suited to your requirements. Contact him, or write us for Bulletin 2424-F.

**OTHER SPECIAL "BUFFALO" FANS FOR SPECIAL CONDITIONS**—If you have a special air or materials handling job involving severe conditions ranging from corrosive fumes to abrasive dust, investigate "Buffalo" Resin-Bonded Fiber Glass Fans... Industrial Exhausters... Volume Fans... Pressure Blowers and Centrifugal Exhausters... Electric Blowers and Exhausters.

Every "Buffalo" product features the famous "Q" Factor — the built-in QUALITY that provides trouble-free satisfaction and long life.

## **BUFFALO FORGE COMPANY**

**BUFFALO, NEW YORK**

**BUFFALO PUMPS DIVISION, BUFFALO, N. Y.**

**Canadian Blower & Forge Co., Ltd., Kitchener, Ont.**

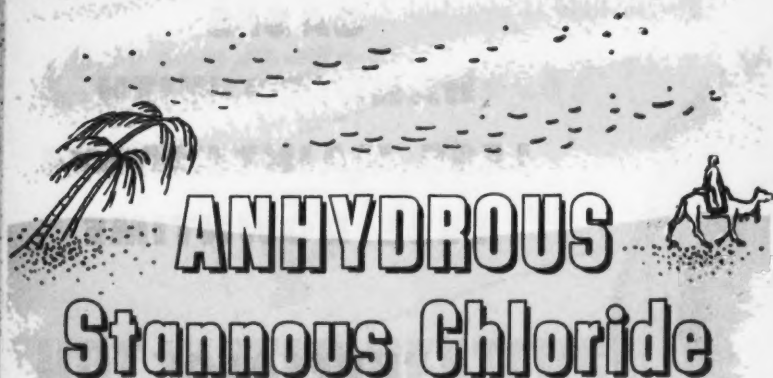


VENTILATING   AIR CLEANING   AIR TEMPERING   INDUCED DRAFT   EXHAUSTING   FORCED DRAFT   COOLING   HEATING   PRESSURE BLOWING

Check 4723 opposite last page



# M&T STANNOCHLOR<sup>®</sup>



*for greater economy,  
stability, versatility*

A highly powerful reducing agent in both non-aqueous and aqueous reactions, M&T Stannochlor (anhydrous stannous chloride) out-performs "tin crystals" in every known application—presents chemists with greater economy and wider versatility.

M&T Stannochlor serves as a tin plating chemical . . . intermediate for other tin chemicals . . . sensitizing agent for metallizing glass, plastics or metals . . . an antichlor . . . a stabilizer for soaps . . . and as an additive for lubricating and fuel oils. Other possible uses are as a catalyst in organic reactions, as an additive for well drilling muds, and as a powerful reducing agent.

### METAL & THERMIT CORPORATION

GENERAL OFFICES: RAHWAY, NEW JERSEY

METAL & THERMIT—UNITED CHROMIUM OF CANADA, LIMITED  
REXDALE, ONT.

### INVESTIGATE ALL OF ITS UNIQUE PROPERTIES

This unique chemical may favorably shape the future of your product or process. The exceptional stability and high purity of M&T Stannochlor assures consistent stannous tin content—even after extended periods of storage. Its anhydrous form offers distinct economy, adaptability and convenience advantages over hydrated stannous chloride.

For more information on M&T Stannochlor or any M&T chemical that interests you consult our insert in Chemical Materials Catalog or write us for a copy of booklet C-57.



INORGANIC TIN CHEMICALS	ZIRCONIUM CHEMICALS	MINERALS & ORES
ORGANOTIN CHEMICALS	ANTIMONY CHEMICALS	METALS & ALLOYS
ORGANOMETALLIC CHEMICALS	PLATING CHEMICALS & PROCESSES	

Check 4724 opposite last page

*You* name the job...

**FILTERING  
SIZING  
STRAINING**

**L-S** makes a  
**WIRE CLOTH** or  
**SCREEN**  
to do it better!

Whatever the special problem imposed by your particular operation—corrosion, high pressure, vibration, heat, abrasion—Ludlow-Saylor has a screen or cloth in stock to meet your most critical requirements, or can weave it to your most exacting specifications, promptly and economically. Of one thing you can be sure—you can't buy better than L-S!

*Write for Condensed Screen Reference Catalog*

Ludlow-Saylor Wire Cloth and Screens can be furnished in stainless, Monel, bronze, brass, copper, oil-tempered, high carbon, or any other metal that can be made into wire.

**Ludlow-Saylor**  
**WIRE CLOTH CO.**  
614 S. Newstead Ave. • St. Louis 10, Mo.

SALES OFFICES: Birmingham, 1727-6th Ave. N.; Chicago, 5708 W. Diversey; Pittsburgh, Union Trust Bldg.; Houston, 1213 Capitol Ave.; Denver, 1530 Carr St. WEST COAST SUBSIDIARY: Los Angeles, Star Wire Screen and Iron Works, Inc., 2515 San Fernando Road.

Check 4725 opposite last page

CHEMICAL PROCESSING

From page 195

less steel inner housing and internal parts. Housing is completely enclosed by a mild steel jacket.

Included with unit is complete control system, integrated into a prewired control cabinet containing all of the required motor starters, interlocking relays, push buttons, pilot lights, and indicating and recording control instruments.

Equipment is started, sequenced, and operated by simple push-button procedures. Safe operation is assured by interlocked temperature limit switches, pressure controls, and approved combustion monitoring devices.

**Results:** With the system, Koppers has a reliable, one-step method for destroying hazardous and corrosive nitrogen oxide. This has been accomplished without the need and use of neutralizing chemicals, absorption towers, liquid scrubbers, or secondary waste disposal system.

(Catalytic nitrogen oxide destruction system was designed and built by Catalytic Combustion Corporation, 4725 Fourteenth, Detroit 8, Mich.)

Check 4726 opposite last page.



"... All right, so I just gave you your biggest contract, ... let's not get mushy ..."

## WHERE CORROSION CHEWS CONCRETE

# Repair economically with ...

# NEW Penntrowel Surfacing Compounds

You mix PENNTROWEL's ingredients right at jobsite, in amount needed ... then just trowel it on!



Corrosion Engineering Dept. 623  
**PENNSALT CHEMICALS CORPORATION**  
Three Penn Center, Philadelphia 2, Pa.

Penntrowel is a trade-mark of Pennsalt Chemicals Corp.

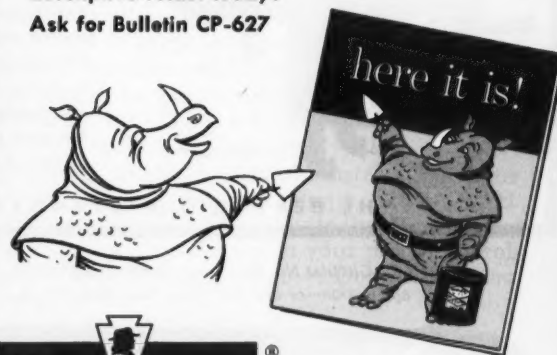
Before you call for a jack-hammer job on severely corroded concrete, try troweling on a tough, corrosion-proof surface on new PENNTROWEL. You'll find that you can now *repair* corroded surfaces ... quickly and economically, with long-lasting results.

**PENNTROWEL gives unmatched corrosion protection** to all concrete, brick and cement surfaces. Material cost is as low as 69c a square foot, for PENNTROWEL Regular Grade applied  $\frac{1}{2}$ " thick. Costs for normal surface preparation and mortar application average only 30c to 65c per square foot.

**PENNTROWEL has been plant-proved** by Pennsalt's own Maintenance Engineers. Surfaces are exposed to rugged service in our plants, which make strong acids, alkalis and solvents. Replacement was a high-priced headache until we developed PENNTROWEL, used it effectively for both repair and preventive maintenance.

**PENNTROWEL surfacing materials are available** in three grades—for corrosion protection, for fluorine service, and for heavy wear.

Write for new  
descriptive folder today!  
Ask for Bulletin CP-627



**Pennsalt  
Chemicals**  
ESTABLISHED 1850

Check 4727 opposite last page



# HOW! PUMP USERS

**NOW YOU CAN KEEP LIQUIDS "PUMP-ABLY" HOT WITH DEAN BROTHERS STANDARD CT PUMPS**

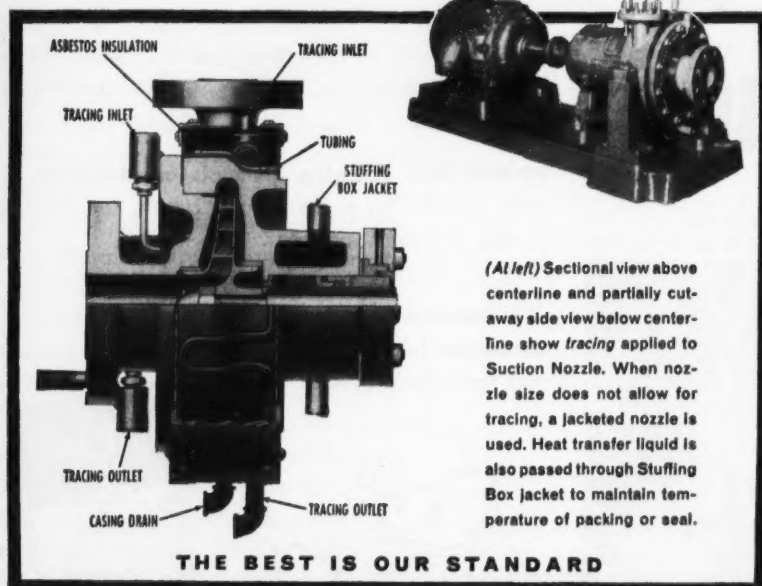
**CT means Constant Temperature— for maintaining process temperatures.**

**Standard means lower cost and speedier delivery.**

● Pumping liquids at or near the temperature at which they congeal, solidify or crystallize requires the transfer of heat to maintain pumped liquid temperature as the liquid passes through the pump. Some of these liquids are:

**PHTHALLIC ANHYDRIDE • ROSIN • UREA  
AMMONIUM NITRATE • SULPHUR • SOME FATTY ACIDS  
TARS AND HEAVY PETROLEUM LIQUIDS • WAXES**

Generally this requires a specially designed pump. Not so with Dean Brothers standard CT process pumps, CT-C and CT-R—available in either Cast Steel-Iron Fitted or all 316 Stainless Steel for parts contacting the liquid. Two methods for transfer of heat are used in Dean Brothers CT pumps: *tracing* and *jacketing*.



(At left) Sectional view above centerline and partially cut-away side view below centerline show tracing applied to Suction Nozzle. When nozzle size does not allow for tracing, a jacketed nozzle is used. Heat transfer liquid is also passed through Stuffing Box jacket to maintain temperature of packing or seal.

Write for Circular No. 195 or our recommendations for your particular application—or call your local Dean Brothers representative.



**DEAN BROTHERS PUMPS INC.**  
EST. 1869

323 West 10th St., Indianapolis 7, Ind.

EXPORT OFFICE: 50 CHURCH ST., NEW YORK 7, N.Y. • CABLE ADDRESS—BROSITES NEWYORK

Check 4728 opposite last page

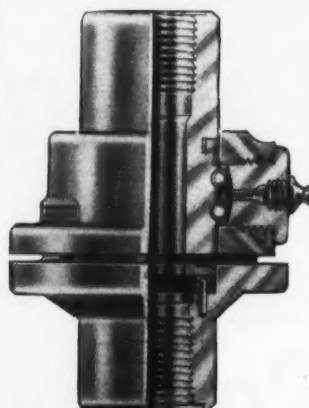
## ENGINEERING & SAFETY

**Packing units replaced without removing swivel joint**

**Uses:** As swivel joint for steam and hot gas service.

**Features:** Design permits packing units to be replaced without removing swivel joint from line.

**Description:** Outer housing of swivel joint is cut apart at packing chamber and both ends are flanged at cut. This permits joint to be parted at packing chamber where disc-



Swivel joint design permits packing units to be replaced in line

type packing seal is located. Swivel joint has maximum temperature rating of 600 F and maximum pressure rating of 300 psi. It is available in sizes  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and 1".

("Discpak" swivel joint is product of Chiksan Company, subsidiary of Food Machinery and Chemical Corporation, 330 North Pomona Ave., Brea, California.)

Check 4729 opposite last page.

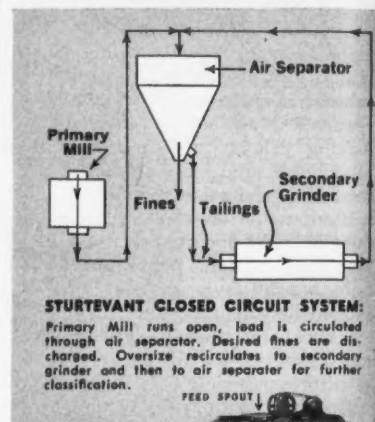
## Water evaporators

Illustrated, eight-page bulletin describes three types of water evaporators including vapor compression apparatus, flash evaporator, and centrifugal compression still. Flow sheets and diagrams are included. Evaporator bul—Evaporator Div., Badger Manufacturing Co., 230 Bent St., Cambridge, Mass.

Check 4730 opposite last page.

## STOP OVERWORKING GRINDING MILLS

**Boost Production of 40 to 400 Mesh Fines As Much As 300%**



**STURTEVANT CLOSED CIRCUIT SYSTEM:** Primary Mill runs open, feed is circulated through air separator. Desired fines are discharged. Oversize recirculates to secondary grinder and then to air separator for further classification.

Current users of Sturtevant Air Separators include manufacturers of sulfur, soybeans, phosphate, chocolate, feldspar, sand, pigments, limestone fillers, abrasives, plasters, ceramics and cement.



**Sturtevant Air Separators Can Lower Power Costs Up To 50%**

Production capacity impossible in single-pass grinding results from using Sturtevant Air Separators in closed-circuit grinding systems. They are of proved advantage in all secondary reduction processes.

Fines pass through grinding mills unhindered, are classified, and the oversize returns for further grinding. Grinding mills are free to perform at top efficiency, their output frequently increased as much as 300% and power costs cut up to 50% (documented by 30 years of Sturtevant air separation experience in the cement industry).

**Precise Classification; Circulates Loads of 800 tph**

Sturtevant Air Separators circulate production loads of up to 800 tph. Simple adjustments make possible counter-action between air currents and centrifugal force to the point where a product of almost any desired fineness may be collected while coarser sizes are rejected.

A 16 FT. STURTEVANT, for example, took a feed rate of 800 tph, containing only a small percentage of desired fines, and delivered 30 tph 90% 200 mesh, recirculating the oversize through the grinding circuit. (In the cement industry, Sturtevant units deliver up to 60 tph raw cement fines, 40 tph finished cement fines.)

Nine models available, diameters from 3 to 18 ft. For more information, request Bulletin No. 087. (Bulletins also available on Micronizers, Blenders, Crushers, Grinders.) Write STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.

Check 4731 opposite last page

CHEMICAL PROCESSING



Full protection for workers engaged in various hazardous operations depends on the right protective clothing. At Hooker, experience has proven one combination to be the . . .

## "right" protective clothing for acid and caustic loading



"First in fashion" at Hooker. Right protective clothing for caustic and acid loading underscores safety

THEODORE W. WETT, Assistant Editor

With PATRICK J. CARMODY, Safety Supervisor  
Hooker Electrochemical Co., Niagara Falls, N. Y.

Hooker, one of the leading producers of caustic, relies on many years of experience handling this and many other chemicals required in processing to pick the right protective clothing for each job. For men handling caustic and acid loading and unloading, the "right" protective clothing, based on Hooker's experience, consists of the following:

### Light-weight, Comfortable

Nylon-neoprene jacket, pants, and hood. Clothing is light weight and affords protection against spraying or splashing. Clothing is comfortable to wear, a big factor in assuring that plant personnel use it at all times.

Goggles, standard eye protection throughout plant, have

indirect ventilating ports. One-piece vinyl lens resists corrosive agents. Flexible frame permits wearing for hours in comfort. It also affords greater impact absorption.

### Latex-coated Gloves

Gloves prevent burns to the hands and their abrasive finish allows men to keep a firm grip on tools and couplings. Since most loading is done outdoors, area and equipment are often wet and slippery. Gloves are coated with natural latex, flocked with non-abrasive natural rubber particles. Coating is chemically welded to strong fabric liners. They are completely liquid-proof.

Shoes are a double safeguard. Safety steel toe gives



## the OLIVER Diaphragm Slurry Pump

Streamlining production methods at the Attleboro, Mass. plant of shellac manufacturing Mantrose Corporation called for complete revamping of material handling procedures. Chosen for replacement of the time consuming step of charging ground shellac slurry to dissolving tanks, the standard O.D.S. is virtually tailored to shellac's requirements.

Yes . . . the link-free, leak-free O.D.S. with no stuffing box and no seals is ideally suited to tough pumping jobs involving abrasive, corrosive and temperature conditions.

And now . . . to provide an even greater range of temperature and corrosion resistance, the O.D.S. is available with diaphragm and lining of DuPont's synthetic rubber — Hypalon.

For complete coverage in the chemical industries only Dorr-Oliver can offer three distinctly different pumps . . . the O.D.S., the Type "L" alloy centrifugal and the Olivite lined centrifugal. From this family can come the solution to your pumping problems. For complete information, write — Dorr-Oliver Inc., Stamford, Connecticut.

Hypalon — Reg. T.M. E. I. duPont de Nemours and Co.  
Olivite — Reg. T.M. Dorr-Oliver Inc.



Check 4732 opposite last page

# Reduce your liquid handling costs!



**Install  
JOHN CRANE**

**TYPE 9**  
EXPENSIVE CHEMICALS  
CORROSIVES  
FLAMMABLE LIQUIDS  
SOLVENTS  
TOXICS



**TYPES 1 and 2**  
ALCOHOLS  
GENERAL CHEMICALS  
LIGHT HYDROCARBONS  
MANY ACIDS  
REFRIGERANTS

**MECHANICAL  
SEALS**

There is no better way to cut liquid handling costs than with "John Crane" Seals. They are specially engineered for the Chemical Industry to provide these important operational savings:

- 1 Eliminating loss of expensive and corrosive fluids.
- 2 Positive sealing of toxics, thus minimizing need for costly exhaust equipment.
- 3 Substantially reduced maintenance and the man-hours involved.
- 4 Reduction of "shutdown periods" due to materially increased service-life expectancy over and above your present methods.

Ranging from the Types 1 and 2 (for services where synthetic rubber is suitable) to the Type 9 (with sealing members made of DuPont Teflon to handle any industrial chemical or corrosive)... there is a "John Crane" Seal that can be adapted to your individual conditions.

**remember:** Your toughest problem can be "John Crane's" next success story.

Don't wait, call us now. Get our seal catalog . . . .

Crane Packing Co., 6421 Oakton St., Morton Grove, Illinois (Chicago Suburb).

In Canada: Crane Packing Co., Ltd., Hamilton, Ont.



**JOHN CRANE**  
**CRANE PACKING COMPANY**  
OFFICES IN ALL PRINCIPAL CITIES

Check 4733 opposite last page

## ENGINEERING & SAFETY

complete toe protection from dropped items, and rubber coating protects against spills or inclement weather. Special non-slip soles assure safety while working around outside areas in all kinds of weather.

(Jacket, pants, and hood are products of Irving Raincoat Co., 657 Broadway, New York 12, New York.)

Check 4734 opposite last page.

(MonoGoggles were supplied by Willson Products Div., Ray-O-Vac Co., Second & Washington Street, Reading, Pennsylvania.)

Check 4735 opposite last page.

(Grab-it gloves are made by Edmont Manufacturing Co., Coshocton, Ohio.)

Check 4736 opposite last page.

(Rubber work shoes are supplied by B. F. Goodrich Co., 928 Main St., Niagara Falls, New York.)

Check 4737 opposite last page.

### Details industrial heater

Bulletin of 26 pages describes construction, application, and performance features of heating and ventilating unit designed to meet industrial requirements, whether for make-up air or for plant heat load. Thirteen performance graphs and charts pertaining to steam capacities, air flow resistance, and other air flow data are included. Bul 750A — American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.

Check 4738 opposite last page.

### Insulation applies quickly and easily with saving in labor and cost

No special skill or training is necessary

Uses: Insulating pipe and tubing in temperature range from -60° to 165°F.

Features: Material can be quickly and easily applied by available labor force. No special skill or training is nec-

# do you screen or size dry chemicals??



## get the facts on BAR-NUN Rotary SIFTERS

Features include:

Stainless steel product zone.

Rapid, accurate separations, achieved by complete, single plane, rotary motion.

Big capacity in limited floor space.

Easy cleaning, sanitation.

Screens totally enclosed in dust-tight box.

All-mechanical, heavy duty assembly of base, drive and box, for vibrationless operation—and durability.

Process plant installations prove the Model "M" Bar-Nun Rotary Sifter the lowest cost sifter over a period of years. Available with from 2 to 78 square feet of screen surface, for single or multiple separations of dry materials, as fine as 325 mesh.

Send for 6-page Bulletin 503.

Specific recommendations and engineering service without obligation. For details on other processing equipment see Gump Insert in CEC.



FEEDING • MIXING • SIFTING • WEIGHING • PACKING  
EQUIPMENT FOR THE PROCESS INDUSTRIES

**B. F. GUMP Co.**

Engineers & Manufacturers Since 1872

1344 S. Cicero Ave. • Chicago 50, Illinois

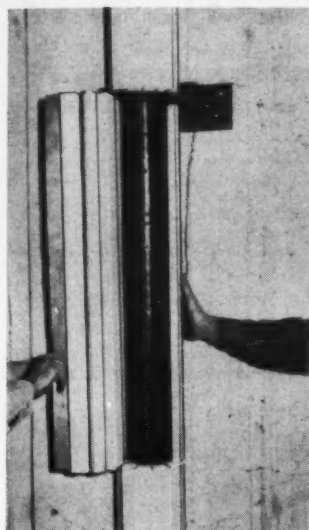
Check 4739 opposite last page

CHEMICAL PROCESSING

## ENGINEERING & SAFETY

essary. Comparable in price to standard low-temperature insulating materials, it can be applied in same amount of time as glass fiber with a pasted canvas finish. Insulation is impervious to moisture, needs no paint, requires no maintenance, and is said to be indefinitely reusable.

**Description:** Pipe covering is formed of segments of Dow Chemicals' Styrofoam 33 accurately cut to seal around



Pipe covering can be quickly and easily installed by available work force. No special equipment or skills are required.

piping or tanks. After cutting, these segments are cemented to an exterior facing of tough polyvinyl chloride film. A portion of film extends beyond last segment to form a pressure-sensitive tab. A quick-release paper protects tab adhesive until pipe covering is ready for use. K factor of insulation is 0.23 Btu/in./sq ft/°F at 40°F mean temperature. Sizes are available for pipe from 1/4 to 36" in diameter, thicknesses from 1 to 3".

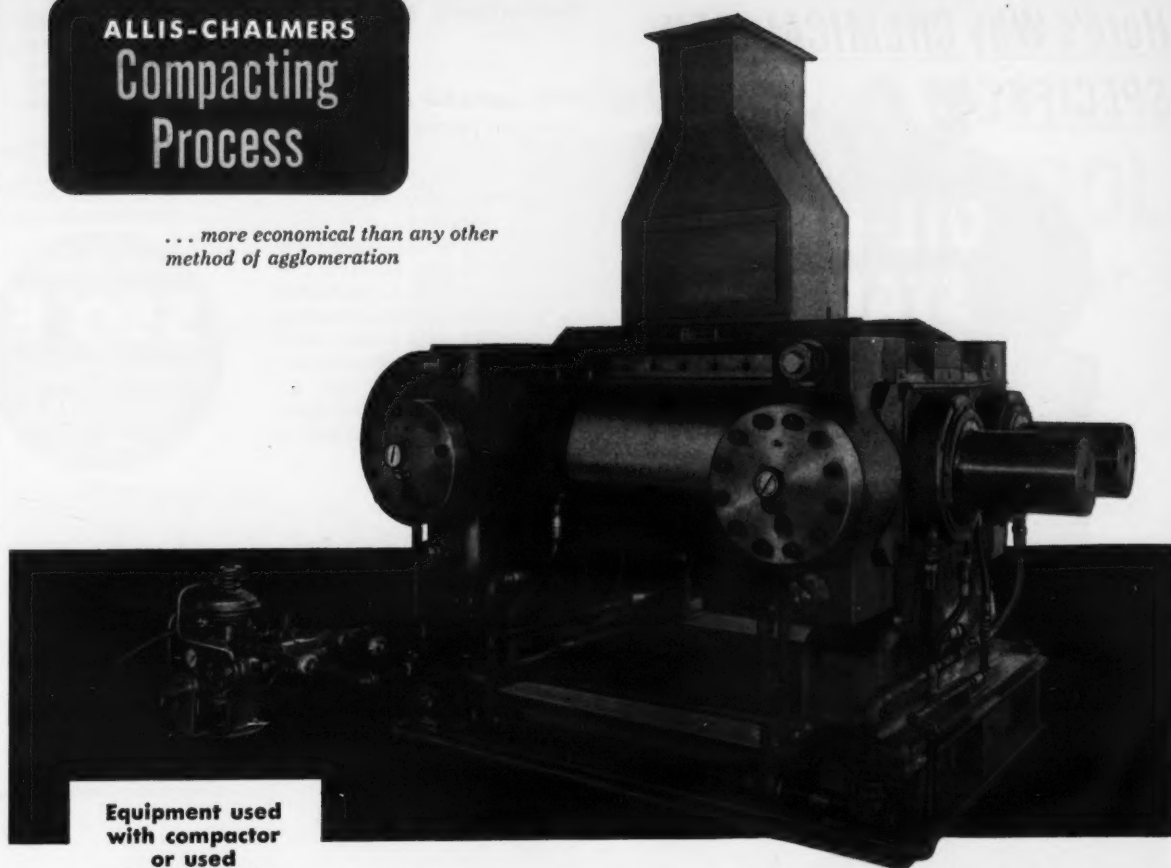
Vinyl facing is corrosion resistant. There are no exposed seams for corrosive fumes or moisture to enter. Finish does not need paint, although paints may be readily applied.

(Fastab pipe covering is a product of Fastab Insulations, Inc., 304 C.T.S. Building, Cleveland 14, Ohio.)

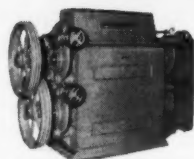
Check 4740 opposite last page.

## ALLIS-CHALMERS Compacting Process

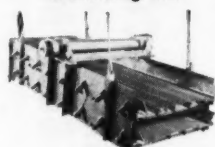
*... more economical than any other method of agglomeration*



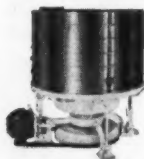
Equipment used with compactor or used independently



Granulating Mill



Aero-Vibe Screen



Gyratory Screen



A-5582

## Upgrade for Profits ... Mechanically

Precise control of particle size, density and solubility factors is now assured with the Allis-Chalmers compacting process. The heart of this efficient, completely mechanical system is this new Allis-Chalmers compacting mill.

### Converts Loss into Profit

By-product material, too fine for use, from the original process, is first densified into slabs or flakes in the compacting mill. Agglomerated product is then granulated in the roller-type mill and separated in the vibrating or gyratory screen. This conversion of by-product material into a usable product changes loss into added profits.

Get Bulletin 07B8836 for the complete story. Ask your A-C representative for a copy, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

Aero-Vibe is an Allis-Chalmers trademark.

# ALLIS-CHALMERS

Check 4741 opposite last page



## Here's Why **CHEMICAL MEN** SPECIFY... **EC&M**

### **OIL-BREAK STARTERS**

(2200-4800 VOLTS)

DESIGNED  
*Specifically*  
FOR DUSTY,  
CORROSIVE  
ATMOSPHERES



Exterior and interior views of EC&M Type ZHS High Voltage Starter in NEMA 3R (raintight) enclosure with threaded connections for conduit

**EC&M Type ZHS Starters** are a "natural" for chemical plant service because the high interrupting capacity ZHS contactor operates under oil—is always well-lubricated, protected from corrosion and requires infrequent inspection. There are other advantages—

**QUICKLY INSTALLED** because starters are shipped with all internal wiring complete. You can really cut installation time and cost with these ready-to-use starters.

**HIGH INTERRUPTING CAPACITY**—These EC&M Starters are available in enclosures for indoor or outdoor mounting, and are supplied in 3 ratings—(1) 50,000 KVA (certified) interrupting capacity (inherent in the starter)—(2) with power-type, current-limiting fuses—(3) VALIMITOR® (volt-ampere-limiter), the bus may be of unlimited KVA.

Write for BULLETIN 8130-CH



**THE ELECTRIC CONTROLLER & MFG. CO.**  
A DIVISION OF THE SQUARE D COMPANY  
CLEVELAND 28, OHIO

8171

Check 4742 opposite last page

## ENGINEERING & SAFETY

### Safe, portable light uses low voltage

For use around grounded, wet metal structures

**Uses:** Provides light for maintenance and cleaning operations around grounded metal structures that are often wet or filled with water, caustic solutions, and electrolytes.

**Features:** Portable light operates at reduced voltages, making it safe for conditions encountered.



Light is safe even when used in dripping wet conditions

**Description:** Set operates at 6, 12, or 32 volts from conventional power source. Unit consists of a circuit-breaker-protected "step-down" transformer housed in a moisture-tight cast aluminum case with a hand lamp extension that plugs into receptacles.

(Portable safety light is product of Dept. V-37, Joy Manufacturing Co., 1201 Macklind Ave., St. Louis 10, Mo.)

Check 4743 opposite last page.

### Discusses drives, motors

Manufacturer's engineering and manufacturing processes, including use of analog computers to determine acceptability of new drive designs, are discussed and illustrated in 12-page booklet on specialized drives and motors. Bul A-2400—Reliance Electric and Engineering Company, 24701 Euclid Ave., Cleveland 17, Ohio.

Check 4744 opposite last page.

ONLY SICON "takes" the 550°F. temperature reached in sections of this Preway heater grille.

ONLY SICON protects this "Direction Flo-Grille" where temperatures often reach above 500°F.

EVEN A HOT  
**550°F.**  
can't faze  
the finish  
when it's

**Sicon**®

SILICONE

### HEAT RESISTANT FINISH

The upper grille of the famous PREWAY heater often reaches a surface temperature of 550°F. Here, the use of an organic finish was found to require raising grille to protect lower part. But in tests Sicon protected so well that re-design proved unnecessary. Sicon in smart decorative colors can protect your product too—and save money besides! Write for proof.



Write for copy of SICON Brochure.

**MIDLAND Industrial Finishes Co.**  
DEPT. D-3, WAUKEGAN, ILLINOIS  
ENAMELS SYNTHETICS LACQUERS VARNISHES

Check 4745 opposite last page

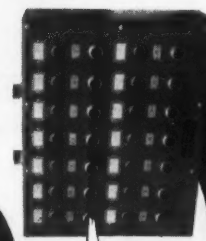
## NOW PUSH BUTTON CONTROL

### FOR DISTRIBUTION OF DRY BULK MATERIALS

Do you ever wonder if your distributor is set on the right bias? The new FOOL-PROOF Hayes & Stol Electric Distributor removes all doubt by signaling accurately your loading position at all times. Position can be changed only by a numbered push-button on the control panel, assuring positive selection. The new H & S Electric Distributor can be fitted with 5 to 20 openings. The diameter of these openings can be specified in 6", 7", 8", 10" and 12" sizes. Adaptable to mounting on elevator legs, collectors, sifters, mixers, screw conveyors and belt conveyors.

CAN BE  
CUSTOM-BUILT  
IN ALL SIZES TO FIT YOUR  
PLANT NEEDS

Extra monitor panels are available to allow for check on settings from anywhere in your plant.



**Electric  
Distributor**

*Hayes & Stol* INDUSTRIAL MANUFACTURING CO., INC.

3521 HEMPHILL ST. P. O. Box 11217, Fort Worth, Texas

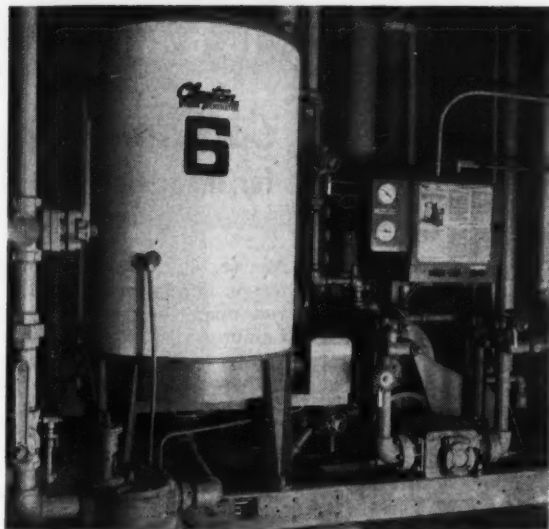
Engineered with care and fully backed by HAYES & STOL WARRANTY

Check 4746 opposite last page

CHEMICAL PROCESSING

Expanding production brings headaches. At W. P. Fuller & Co., steam demand was outstripping capacity. Decentralization of steam supply reduced modernization cost, plus yielding a bonus as . . .

## steam generators save \$7600 a year



One of six steam generators at W. P. Fuller & Co. Plant flexibility is increased and fuel costs cut 50%

**THEODORE W. WETT**, Assistant Editor  
With **JOHN A. PANELLA**, Superintendent  
Lead and Operating Department  
W. P. Fuller & Co., San Francisco, Calif.

**Problem:** Estimated cost for modernizing the steam system at W. P. Fuller & Co., was \$80,000. A leading producer of paints, varnishes, and specialized finishes on the Pacific Coast, company has 25 buildings totaling about one-half-million square feet on a 38-acre site. Growing demand for process- and space-heating as production expanded made a refurbishment of boilers and steam lines imperative. Central steam-making equipment limited plant flexibility since separate processes could not be operated without

maintaining steam for a large portion of plant.

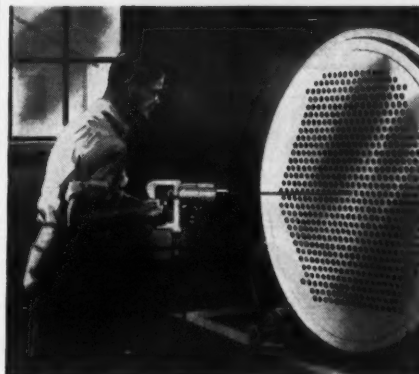
**Solution:** Management at Fuller decided, as the proverb goes, to kill two birds with one stone and increase plant flexibility by decentralizing source of steam while reducing cost of obtaining necessary capacity. Six steam generators were installed at intervals from June 1955 to April 1957. Units were installed close to major points of steam use. Compactness of generators made it easy to install them without costly removal and replacement of

Fouled condenser tubes causing trouble?

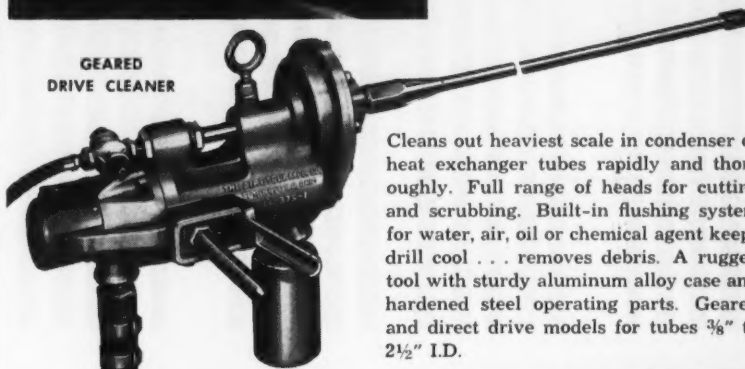
Take action with

# AIRETOOL

## Condenser Tube Cleaners

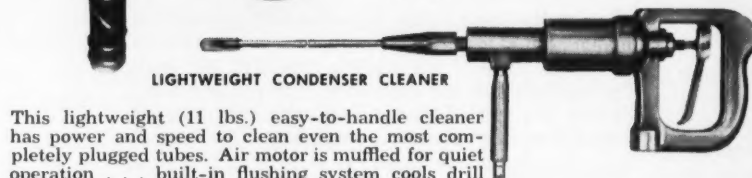


GEARED  
DRIVE CLEANER



Cleans out heaviest scale in condenser or heat exchanger tubes rapidly and thoroughly. Full range of heads for cutting and scrubbing. Built-in flushing system for water, air, oil or chemical agent keeps drill cool . . . removes debris. A rugged tool with sturdy aluminum alloy case and hardened steel operating parts. Geared and direct drive models for tubes  $\frac{3}{8}$ " to  $2\frac{1}{2}$ " I.D.

LIGHTWEIGHT CONDENSER CLEANER



This lightweight (11 lbs.) easy-to-handle cleaner has power and speed to clean even the most completely plugged tubes. Air motor is muffled for quiet operation . . . built-in flushing system cools drill and removes cuttings. An excellent maintenance tool for tubes up to 1".



CLEANERS

Full range of sizes and types for straight and curved tubes.



CUTTERS

Air or electric driven for steel and non-ferrous tubes.



EXPANDERS

Pneumatic operated unit and electric expansion control systems.

Contact your Airetool representative or write for literature.

REPRESENTATIVES:  
in principal cities of  
U.S.A., Canada,  
Mexico, South  
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CANADIAN PLANT:  
37 Spalding Drive,  
Brantford, Ontario

EUROPEAN PLANT:  
Vlaardingen, The  
Netherlands



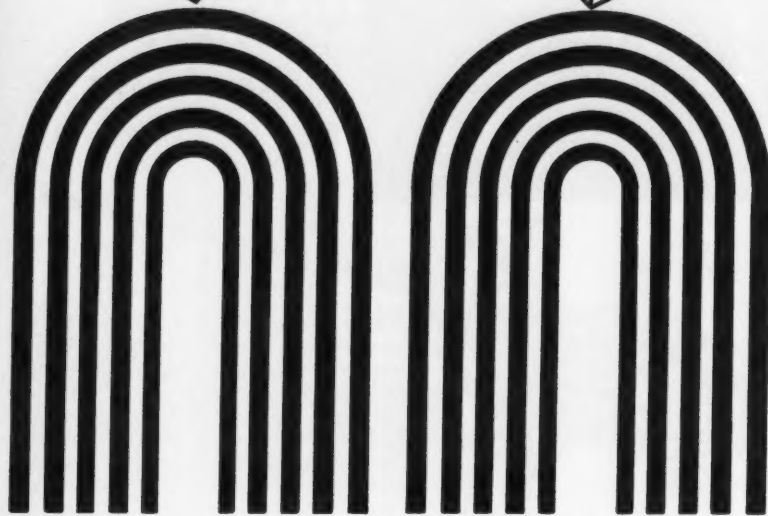
SPRINGFIELD, OHIO

BRANCH OFFICES:  
New York, Chicago,  
Tulsa, Philadelphia,  
Houston, Baton  
Rouge

Check 4747 opposite last page

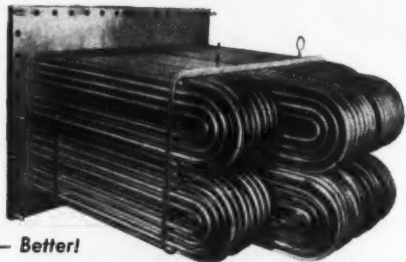
## Why your Paracoil corrosion-resistant heat exchanger

won't "get weak  
in the knees"



...or at the joints either. Corrosion-resistant materials have a habit of losing their corrosion-resistant properties at critical points if not properly fabricated. But Davis Engineering's skill and experience in metals and alloys insures you Heat Exchange Equipment with constant corrosion-resistant strength... especially at the "knees".

Davis Engineering is prepared to meet all your requirements for heat exchangers and process equipment by designing and fabricating equipment in bronze, copper, Monel, Inconel, carbon and stainless steels, nickel and aluminum.



Davis Makes It — Better!

All stainless steel, type 316, tube bundles and tube sheet... typical of how Davis Engineering solves your difficult and special fabrication problems.

Write for Bulletin 1000

### DAVIS ENGINEERING CORPORATION

30 Rockefeller Plaza, New York 20, New York Circle 6-5650  
1064 East Grand Street, Elizabeth 4, New Jersey Elizabeth 2-6780

Check 4748 opposite last page

## ENGINEERING & SAFETY

walls. Piping, conduit, insulation, and ditching were held to a minimum.

Principle of operation of steam generators is based on forced recirculation. Water enters generator, circulates at high velocity in a single passage through a continuous coil. Steam temperature is attained as water passes through heating zone and into accumulator. Here steam and water are centrifugally separated. Unexpanded water drops to bottom of accumulator, and is recirculated by positive-displacement diaphragm pump and returned to heating cycle. Unit produces steam only as needed, automatically. Proper ratio of air, fuel, and water generate steam for immediate use only. No attention is required for continuous operation except start-up and occasional blow-down.

**Results:** Total cost of installation was less than the estimated cost of bringing former system up to desired efficiency and capacity, actually little more than half: Estimated modernization cost, \$80,000; actual cost for steam generators, \$45,000. In addition, W. P. Fuller Co. believes it has saved about \$3600 a year on fuel, \$1000 a year on water, and \$3000 on labor.

Hot well space is no longer needed. Independent generators enable company to operate any number of departments as required.

Units are on the job 16 hours a day. During 18 months of operation, costs of repair and servicing have been negligible.

(Steam generators are a product of Clayton Manufacturing Co., El Monte, Calif.)

Check 4749 opposite last page.

### Handling contaminants

Folder of 12 pages illustrates 26 different enclosures for safe handling of all types of contaminants. Contaminant handling folder — S. Blickman, Inc., 8400 Gregory Ave., Weehawken, N. J.

Check 4750 opposite last page.

from a small piece



to a carload...

**Call Cambridge**  
for Industrial Wire Cloth

Almost any standard mesh or weave, in any metal or alloy, that you might need is right here at Cambridge—waiting for your call. Partly, that's the secret behind the confidence purchasers have in ordering from Cambridge. They know their order will be filled promptly! Then too, they're sure of getting quality wire cloth. Every operation in the production of Cambridge wire cloth is rigidly controlled to assure accurate mesh count and uniform mesh size. Each loom is individually operated and the cloth is constantly inspected.

### IF YOU NEED WIRE CLOTH FABRICATIONS

—we can build them quickly and accurately from your prints. Or, our engineers will draw up prints for your O.K. Why not get in touch with your Cambridge Field Engineer soon, and find out all that Cambridge offers you in the way of wire cloth. He's listed in the phone book under "WIRE CLOTH". Or, write direct for FREE 94-PAGE CATALOG and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.

**The Cambridge Wire Cloth Co.**

Dept. F • Cambridge 4, Md.



METAL MESH  
CONVEYOR  
BELTS

WIRE CLOTH  
FABRICATION

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

Check 4751 opposite last page

CHEMICAL PROCESSING



## THAT'S INTERESTING

### Floating power

A barge-mounted power system will be moved from place to place where the power is needed around Lake Maracaibo, Venezuela. Turbine, 16,000 kilowatts, will burn natural gas.

### Many ways

There are some 900 possible, usable combinations of fuel type, moderator, neutron speed, fuel configuration, and coolant materials for nuclear reactors. Problems already foreseen bring this wide range down to about 50 that seem suitable.

### The winner

Taking a page from their own book of advice to customers, Librascope, of Glendale, Calif., cut almost two hours off time needed to determine winner of the company golf tournament recently. Desk-size model had results ready in minutes.

For more information on product at right, specify 4752 see information request blank opposite last page.



If you're mixing one of these products  
... or any wetted or pasty solid material

# HERE'S YOUR HANDBOOK ON MULLING!

bulletin 522

## SIMPSON MIX-MULLERS

**MULLING ... FOR THE CHEMICAL AND PROCESS INDUSTRIES**

national engineering company • chicago 6, illinois

**ABRASIVES**  
ADHESIVES  
ALUMINUM FLUX  
ANIMAL FEED  
ARTIFICIAL STONE  
ASBESTOS INSULATORS  
ASPHALT PRODUCTS  
ASPHALT TILE  
BATTERY PASTE  
BRAKE LINING  
CARBON PRODUCTS  
CATALYSTS  
CERAMIC TILE  
CHARCOAL BRIQUETTES  
COAL BRIQUETTES  
COSMETICS  
CRUCIBLES  
DETERGENTS  
DRY BATTERY  
COMPOUND  
DYE AND BLEACHING  
POWDERS  
ENAMEL FRIT  
EXPLOSIVES  
FERTILIZERS  
FOOD PRODUCTS  
GLASS BATCHING  
GLAUBERS SALT  
GRAPHITE  
GREASE  
INSECTICIDES  
LEAD PENCIL STOCK  
NICKEL OXIDE  
PAPER COATINGS  
PHARMACEUTICALS

**ZIRCONIA**

PIPE SEALING  
COMPOUNDS  
PLASTER  
PLASTICS  
PORCELAIN  
POTTERY  
POWDERED METALS  
PUTTY  
REFRACTORIES  
ROOFING GRANULES  
RUBBER COMPOUNDS  
SOAP  
SYNTHETIC FUELS  
THERMITE WELDING  
MATERIALS  
TITANIUM DIOXIDE  
TOBACCO  
TRANSITE SCRAP  
RECLAMATION  
WATER TREATMENT  
COMPOUNDS AND  
BOILER COMPOUNDS  
WELDING ROD  
COATINGS  
WOOD FIBER —  
SAWDUST,  
RESIN, ETC.

There's nothing new about mulling—it dates back to the tethered ox and stone wheel. What is new is industry's increasing need for the kind of blending that can be realized *only* with mulling.

Here's your chance to find out more about how mulling can fit into your picture. See why and *where* it differs from ordinary mixing methods . . . how, through uniform blending, you can make the most of today's, all too valuable, ingredients—yet prepare the mix faster and more economically.

And, of course, we talk about Simpson Mix-Mullers. So will you—after you've read the specs on the new F Series. 40 years of mixing experience on processing materials from Abrasives to Zirconia have made the name Mix-Muller synonymous with quality mixing . . . and every hour of that experience is built-in to the new F Series.

So, if you mix, and it's wet but not a fluid . . . dry but not a powder, bring your catalog file up-to-date on the *latest* in mulling! Send for the free Mix-Muller Handbook, on your letterhead please, today.

**FOR YOUR CONVENIENCE** in determining the proper cubic foot batch capacity range to fit the character of your product, a table for converting your present measurement of substances . . . from Alcohol to Zinc Ore, is included in the new Mix-Muller Handbook.

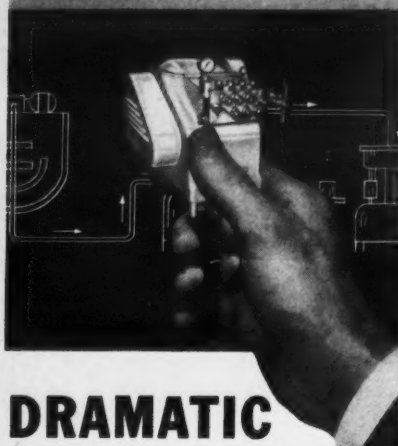


## SIMPSON MIX-MULLER® DIVISION

NATIONAL ENGINEERING CO., 640 Machinery Hall Bldg., Chicago 6, Ill.  
(Not Inc.)



## HOMOGENIZING



## DRAMATIC MONEY-SAVING APPROACH TO

### Blending, Dispersing, Emulsifying

Gaulin Particle Control . . . plus GTA . . . gives you the *right* answer on the most inexpensive method to disperse, emulsify or blend your product.

- Homogenizers in GTA Bulletin H-55.
- Sub-Micron Dispersers in GTA Bulletin SMD-55.
- RE\* Colloid Mills in GTA Bulletin C-57.
- Laboratory Homogenizers in GTA Bulletin LH-55.

GTA shows how to: Improve uniformity; stop separation; accent taste; improve texture; speed chemical reactions; reduce amount of materials needed; and easily control and duplicate your product.

It's easy to try Particle Control. Rent a Gaulin Laboratory Homogenizer or Colloid Mill for only \$75.00 a month and see how your product can be made better, faster and cheaper.

#### Some Typical Applications of GTA

Wax emulsions	Leather finish
Resin emulsions	Carbon black dispersion
Pigment dispersion	Vinyl-pigment dispersions
Adhesives	Grease and petroleum production
Fat emulsions	Suspensions
Experimental coating colors	Cosmetic and hand cream blending
Chemical reactions	Soap processing
Pharmaceuticals	Latex compounding
Dope dyeing	
Light ink dispersions	



**Manton-Gaulin Manufacturing Co., Inc.**  
55 Garden Street, Everett 49, Mass.  
World's largest manufacturers of high pressure pumps, homogenizers and colloid mills.

Check 4753 opposite last page

## ENGINEERING & SAFETY

### Vinyl-coated glass fiber safety clothing fabric acid-, heat-resistant

Addition to manufacturer's line of safety clothing is an acid-resistant vinyl-coated glass fiber with a distinctive green color. In addition to offering acid resistance, fiber can also repel light molten splash.



Safety fabric of acid-resistant vinyl-coated glass fiber also affords protection from heat

Fabric can be tailored for use with all types of respiratory equipment and other safety aids as well as clothing. Sample swatches are available for test and analysis.

("Greenwear" is manufactured by Wheeler Protective Apparel, Inc., 224 West Huron Street, Chicago 10, Ill.)

Check 4754 opposite last page.

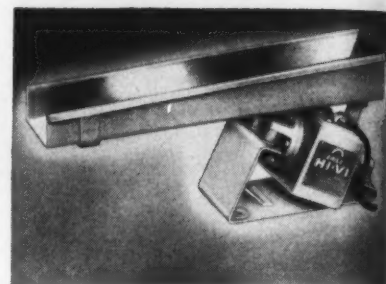
### Cut footage, labor costs, on 3/4 to 3" diam pipe, with expansion joint

Uses: For handling pipe expansion problems on systems of 3/4 to 3" diam.

Features: Units prove advantageous in restricted spaces and long runs of parallel piping. Fabrication of jointed loops and bent pipe are eliminated, cutting cost of extra pipe footage and instal-

# ERIEZ presents the "feeder of the future"

Here's the feeder that's way out in front for quality, price and performance. Based on entirely new concepts in design and construction materials it provides *automatic*, accurate, controlled feed of bulk materials. Use it for spreading, sorting, aerating, cooling, drying, sifting, separating, proportioning, etc. Gives a smooth, level flow to all bulk materials, variable from ounces to tons per hour. For hot, dry, dusty, lumpy, abrasive lines. Quickly pays for itself in increased production; lower maintenance and operating costs.



PAT. PEND.

#### These are the features YOU asked for!

- Electro-permanent magnetic drive; has lifetime powered Alnico V magnet, needs no rectifier—just plug or wire in
- Totally enclosed drive elements; dust- and moisture-resistant
- Disc-type glass fiber springs; rustproof, won't pack or corrode
- Greater capacity than comparable size units
- Superior control; full feed or dribble feed
- Quality control; all units pre-tested and stabilized at factory



Magnetic  
SEPARATION  
AUTOMATION  
VIBRATION  
Equipment

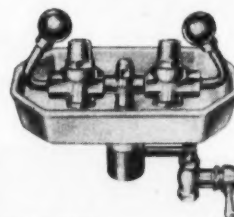
Interesting reading matter tells about complete Eriez line. Write to

**ERIEZ MFG. CO., 73D Magnet Dr., Erie, Pa.**

Check 4755 opposite last page

## Protect Eyes

### with HAWS EMERGENCY EYE-WASH FOUNTAINS



**Model 8930:**  
Basic eye-wash model; enameled iron bowl, chrome plated brass heads. HAWS also offers eye and face wash fountains and drench showers.



Chemicals, foreign particles, caustics—all mean DANGER to eyes! Instant relief is vital! HAWS Eye-Wash Fountains flood the eyes with controlled water streams—soothing, relieving until medical aid arrives. Fool-proof operation activates fountain instantly, possibly avoiding permanent injury. HAWS Emergency Facilities are also widely used for routine cleansing of eyes as a precautionary measure. Write today for illustrated literature on HAWS complete line of emergency facilities.



**DRINKING FAUCET CO.**

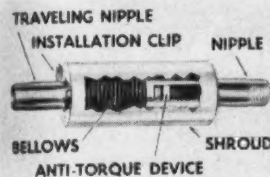
(Since 1909)  
1443 FOURTH STREET  
BERKELEY 10, CALIFORNIA

Check 4756 opposite last page

CHEMICAL PROCESSING

lation labor.

**Description:** The expansion compensator is available with standard pipe nipples or with welding ends. Of all-welded construction, joint consists of two-ply stainless steel bellows, confined in sheath of steel boiler tube. Internal



Compensator handles pipe expansion problems in systems of  $\frac{3}{4}$  to 3" diam

guides furnish anti-torque, anti-squirm protection to bellows and provide travel-limit stop in both compression and extension.

Device accommodates  $1\frac{1}{2}$ " of axial motion due to thermal expansion of piping and will extend  $\frac{1}{4}$ " beyond normal to take care of unusual pipe contraction. No maintenance or inspection is required and joint is designed to last as long as piping system.

(The expansion compensator is product of Flexonics Corporation, Maywood, Ill.)

Check 4757 opposite last page.

**Light, compact clutch is easily removed**

No need to disturb shafts

**Uses:** For ball mills, rod mills, compeb mills, and kilns.

**Features:** Lighter and more compact than conventional units, entire clutch operating mechanism can be removed without disturbing shafts.

**Description:** Heavy-duty electro-magnetic disc clutches have maximum torque of 120,000 ft-lb and 4878 sq in of lining area.

(Electro-magnetic disc clutches, 4200 series, are product of Stearns Electric Corporation, 120 North Broadway, Milwaukee 2, Wisconsin.)

Check 4758 opposite last page.

# YOU NAME IT....

26% Uranium Ore  
in a 10% Sulphuric  
Acid Solution

CHLORINATED  
SALT BRINE

Sulphurous  
Acid

Latex

Stoddard  
Solvent

Cellulose Acetate

Muriatic  
Acid

Hydrofluoric  
Acid

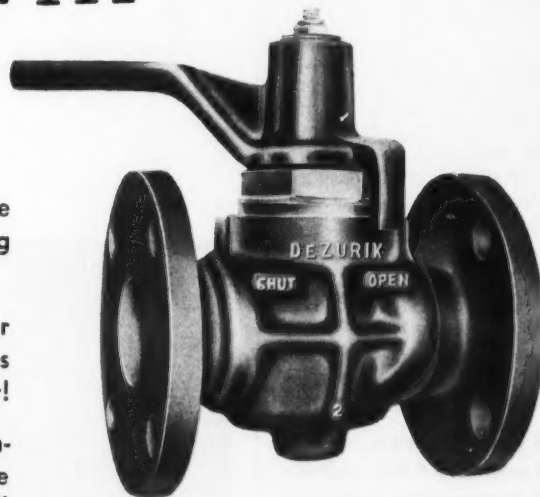
## ...DeZURIK WILL VALVE IT!

DeZurik Valves have been specified as the standard in many plants as the result of being installed on a "tough-to-handle" service.

It's easy to see that if they handle the tougher services, they'll handle the easier ones with less maintenance, less trouble and they'll last longer!

They need no lubrication (no chance for contamination!), they won't leak (no expensive process material down the drain!), and they'll withstand your toughest corrosion problems.

Let the DeZurik representative in your area give you the complete story, or write for more details on DeZurik Valves.



**DeZURIK**  
**CORPORATION**  
SARTELL, MINNESOTA

Check 4759 opposite last page



**All-aluminum platform  
for tank car inspection  
assures safety**

Safety during tank car inspection can be assured with all-aluminum safety platform used in conjunction with straight or extension aluminum ladder. Nonskid aluminum floor, guard rail around sides and back, and chain which fastens across entrance are safety features of platform.



All-aluminum inspection platform assures safety during tank car inspection

Since it is constructed entirely of aluminum, platform is nonsparking and safe to use around highly flammable materials. Bolted to ladder, unit is lightweight and easy to handle. Platform can be easily detached from ladder.

(Aluminum inspection platform is product of the Aluminum Ladder Co., Dept. D11, Worthington, Pa.)

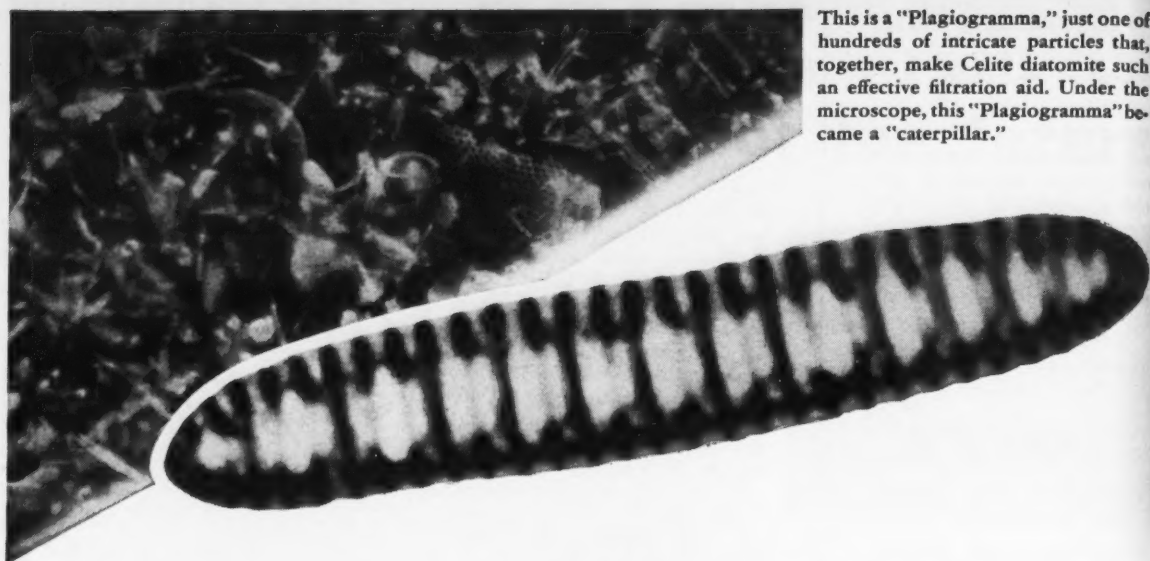
Check 4760 opposite last page.

**New circuit breaker design  
1/3 smaller, 55% lighter  
than comparable units**

Quick-make manual closure,  
closed-door draw-out

**Uses:** As low-voltage power circuit breakers.

**Features:** Equipment is 1/3 smaller and 55% lighter than comparable units. It has quick-make manual closure,



This is a "Plagiogramma," just one of hundreds of intricate particles that, together, make Celite diatomite such an effective filtration aid. Under the microscope, this "Plagiogramma" became a "caterpillar."

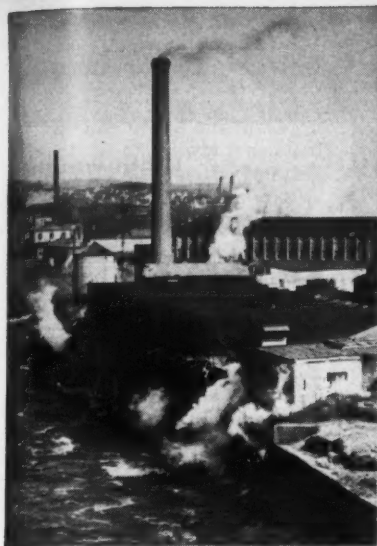
*What's this "caterpillar" got to do  
with lower filtration costs?*

# It's a particle of CELITE that covers more



**Assures highest purity  
in pharmaceuticals**

Among the many important uses of Celite diatomite filter aids in industry today is the vital part they play in the production of life-saving antibiotics. Not only does Celite safeguard the purity of aureomycin, streptomycin and other pharmaceuticals; they also provide substantial cost savings that permit wider usage of these wonder drugs.



**Protects communities from contaminated plant waste**

Celite helps control pollution through removal of suspended solids from plant waste waters. Celite treatment often permits plants to reuse this water.



**Provides greater clarity in varnish, lacquer and shellac**

Celite filtration provides the high degree of clarity required in clear finishes. Celite is also widely used by the paint industry as a flattening agent and pigment extender.



**Gives appetizing sparkle to syrups, jellies and other foods**

Many food processors make an important *sales plus* of the outstanding brilliance that Celite provides. Celite also helps increase juice yields as a pressing aid.

# -the diatomite filter aid filter surface per pound

THAT'S RIGHT. Celite\* is the diatomite that gives you superior clarification at fast flow rates PLUS lower wet density. And lower wet density simply means greater surface coverage per pound of Celite. Which means substantial savings to you, for 6 bags of Celite will actually do the work of 7 bags of other diatomites.

And Celite is uniform. Every pound of it comes from Lompoc, California, the world's largest and purest diatomite deposit. Here, J-M technicians process and grade it so that no matter which convenient J-M warehouse you order from, the physical and

chemical properties of each grade will never vary.

In addition, from Celite's full line of filter powders you can select the one grade that will give you the clarity you need at the highest flow rate.

So if filtration belongs in your processing operations, it will pay you to call in your local J-M Celite engineer. Backed by Johns-Manville's research facilities and years of practical diatomite experience, he can help you with your filtration problems. Call him today or write Johns-Manville, Box 14, New York 16, New York. In Canada, write 565 Lakeshore Road East, Port Credit, Ontario.

\*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.



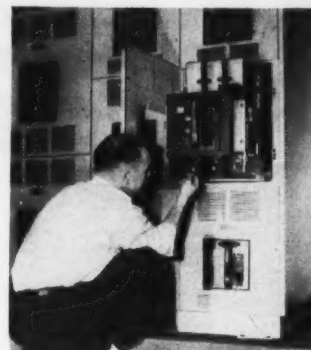
## Johns-Manville CELITE FILTER AIDS

Check 4761 opposite last page

## ENGINEERING & SAFETY

closed-door draw-out operation. Accessibility for operation and servicing has been greatly increased.

**Description:** Low-voltage power circuit breakers are available in 600-volt units in 225-, 600-, and 1600-ampere



Accessible for easy adjustment

frame sizes. Sub-assembly construction slashes time needed for parts replacement and servicing. The breakers can be moved from operating to test and disconnect positions within their enclosure without opening switchgear cabinet doors. Reduction in breaker size permits four-high stacking of 600-ampere breakers in standard 90-inch high enclosures.

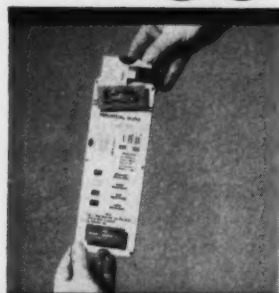
(K-line circuit breakers are product of Switchgear Division, I-T-E Circuit Breaker Company, 19th and Hamilton Streets, Philadelphia 30, Pa.)

Check 4762 opposite last page.

### Vacuum calculator

Handy-size slide rule quickly determines pumping capacity needed to evacuate a given volume to a specified vacuum in a given time, or computes time with a pump whose capacity is known. It calculates cylindrical tank capacities in terms of cubic feet per foot and gallons per foot, and gives boiling points of eleven common solvents, and vapor pressure of nine metals. Vacuum calculator is free on request from Vacuum Equipment Div., F. J. Stokes Corp., 5500 Tabor Road, Philadelphia 20, Pennsylvania.

# SURETY SHOWS YOU HOW YOU CAN CONTROL GLOVE COSTS



**1** Surety's slide rule chart accurately guides your glove selection by showing how various glove materials withstand chemicals, oils, acids, solvents, etc. It's yours free—send for it now.



**2** Choose the gloves best suited for your needs by telling us what you subject them to on the job. We'll make a recommendation and send samples.



**3** Put the Surety gloves we recommend on the job—check their service life and the users comfort. Then compare and see how Surety gloves keep costs at the lowest level.



The Surety Rubber Co.,  
Carrollton, Ohio  
Please send us a Surety  
glove selector.

Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_  
Your Name \_\_\_\_\_ Title \_\_\_\_\_

WE USE GLOVES FOR \_\_\_\_\_  
(Tell us full details on your letterhead)

In Canada: Safety Supply Co., Toronto

Check 4763 opposite last page

## ENGINEERING & SAFETY

### Vibration-proof equipment without disassembly, cuts maintenance

Liquid plastic is non-volatile  
and thermosetting

Uses: For locking nuts and bolts against vibration.

Features: Material replaces lock washers and lock nuts, giving up to five times removal torque of these devices. It sets up nuts and bolts so securely that no amount of vibration will shake them loose, yet they can be removed with ordinary tools. Equipment can be made vibration-proof without disassembly. Maintenance can be scheduled less frequently, saving valuable man-hours.

Description: Non-volatile, thermosetting, plastic sealant is thin liquid which wicks into spaces between threads without having to remove fastener. Series of grades of different strengths enables user to choose proper locking torque for particular application.

For cadmium or zinc plated parts, special activator is included that insures proper locking action.

(Loctite sealant and thread locking kits are available from American Sealants Company, 103 Woodbine St., Hartford 6, Connecticut.)

Check 4764 opposite last page.

### Gas detector

Instrumentation for centralized process control and industrial safety is subject of eight-page bulletin on combustible gas analyzer. Bul 1703-4 — Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.

Check 4765 opposite last page.

### Fire doors cut plant loss, restrict damaging blaze in paint shop

By restricting damage that could have been multiplied several times, an effective fire door system sealed off a roaring inferno, that caused a

## Light weight non-corrosive ALUMINUM GRATING

Unique "J" lock construction adds greater rigidity and longer life to Dravo's Aluminum Grating. Available in non-slip serrated or plain surfaces. Best for grating applications where light weight, corrosion resistant, spark proof construction is required.

For information, write  
Dravo Corporation, Dept.  
D-2704, Pittsburgh 22, Pa.

**DRAVO**  
CORPORATION

Check 4766 opposite last page

## CUSTOM FABRICATING DATA—Request New Brochure M-56

This information on plant facilities and services will be of value to purchasing, procurement and engineering personnel when planning the custom fabrication of...



## PROCESS TANKS

for the Chemical Processing  
Industry on the West Coast

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on your next job



**PUGET SOUND  
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Craftsmen in steel plate and alloys up to 1"

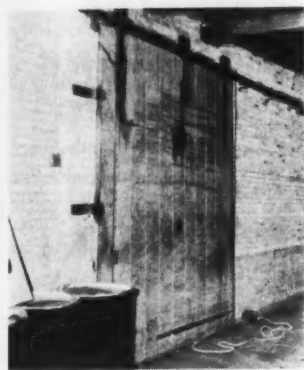
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CHEMICAL PROCESSING



\$250,000 loss to a paint shop.

The fire broke out during a test run of newly installed \$70,000 automatic painting system. Resulting from an explosive flash, the fire, fed by approximately 800 gal of



Although a fire caused \$250,000 damage on opposite side of this fire door, this side of wall remained free of fire or smoke damage. Note broken fusible link in lower right foreground which released fire door and confined fire to paint shop on other side

paint and thinner, instantly ripped through the area. The heat broke a fusible link, releasing the fire door system which automatically closed and confined the fire to the paint shop area and away from other buildings of the plant. As a result, firemen brought the blaze under control within a very short period of time.

(Fire doors are product of Richards-Wilcox Manufacturing Company, Aurora, Ill.)

Check 4768 opposite last page.

#### Soften big noise

How the tremendous noise of a gas turbine engine can be effectively silenced is explained in company's 12-page brochure. Ten easy steps to determine what type of sound control unit is necessary are outlined. Gas turbine silencing brochure — Industrial Sound Control Dept., Metal Products Div., Koppers Co., Inc., PO Box 298, Baltimore 3, Maryland.

Check 4769 opposite last page.

Where performance is the measure

**FAIRBANKS-MORSE**

**GUARDED**

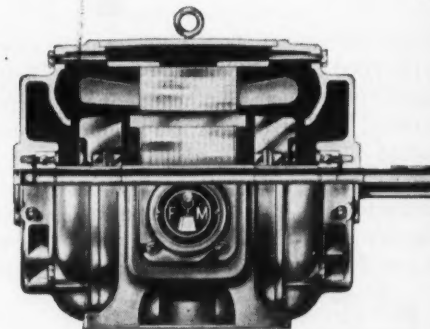
**Dripproof**

**SQUIRREL CAGE INDUCTION**

## Get the inside story...

... of Fairbanks-Morse design and manufacture that set the standard of performance for motors that fulfill NEMA B, C and D requirements. Send today for Bulletin 1150 and get all the facts—including details on F-M exclusive Copperspun rotor.

Fairbanks, Morse & Co., Dept. CP-4, Chicago 5, Ill.



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*a name worth remembering when you want the BEST*

ELECTRIC MOTORS AND GENERATORS • DIESEL LOCOMOTIVES AND ENGINES • PUMPS • SCALES • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS

Check 4770 opposite last page

**PRODUCTS**  
**THAT CREATE EXCITING ADVANCES**  
**IN THE PROCESS INDUSTRY USUALLY**  
**GET STARTED IN BRIGHTON**  
**FABRICATED EQUIPMENT**



Brighton's fabricating skill is evident in the 2,000 gallon capacity set kettle, capable of producing synthetic resins, plastics, adhesives, varnishes and bodied oils of equal quality. It can also be used for many other synthetic products. This Brighton equipment was fabricated to specifications, and is now in an integral segment of a

chemical plant operation. Brighton's complete engineering department provides the technical information, our facilities deliver the products within the specified time. Send Brighton your problems. We're equipped to fabricate in every type of alloy metal. Write for a Catalogue.

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Check 4771 opposite last page

**ENGINEERING & SAFETY**

**Valve flanging compatible with other components**

Design of high-vacuum valve permits simple piping

**Uses:** In vacuum systems for atomic power, chemical, metallurgical, electronic, plastics, petroleum, missile, microwave, and many processing industries.

**Features:** Choice of flange dimensions and minimum space between flange faces is obtainable in valve. Flanging compatible with other components can be selected without requiring special adaptors or extra fittings. Design permits simple, uncomplicated piping resulting in construction economies.

**Description:** Six-inch high-vacuum valve has four standard flange combinations available from stock. Any special specification, within limits of flange diameters, is quickly available.

Valve also has positively sealed O-ring stuffing box, lightweight aluminum alloy construction, and proved performance to pressures lower than 10<sup>-6</sup> mm Hg. Unit is 100% leak tested and guaranteed leak tight. It is available with manual or remote control.

(VG-106T high-vacuum valve is available from Vacuum Research Co., 420 Market St., San Francisco 11, Calif.)

Check 4772 opposite last page.

**Instantly applied safety signs**

Hundreds of signs for providing safety from radiation, explosives, and other hazardous conditions and for other applications are available in a self-adhering material. By removing backing on material, sign can instantly be applied to metal, wood, tile, glass, cement, and other surfaces. Signs can be made to meet requirements.

(Safety and industrial signs are product of Westline Products Div., Western Lithograph Co., 680 East 2nd St., Los Angeles 54, Calif.)

Check 4773 opposite last page.

*Dependable,  
Low Cost*

**• GRINDING**  
**• MIXING**  
**• BLENDING**

**abbé**  
**ENGINEERING**  
**PEBBLE and BALL MILLS**



**EASY TO CLEAN**

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For quality-controlled, low cost dry or wet grinding, mixing or blending on a production basis, you'll find Abbé-Engineered Pebble and Ball Mills unequaled in production speed, operating cost and service life.

Abbé-Engineered Pebble and Ball Mills are available in a complete range of sizes from 40 to 13,000-lb. capacities.

Ask for quotation on Abbé "Non-Contaminating" Rubber-Lined Pebble Mills. Write for Abbé Mill Catalog No. 77

Address Dept. 46

**abbé** ENGINEERING CO.  
 50 Church Street  
 New York 7, N. Y.  
 Designers and Manufacturers of  
 Ball, Pebble and Jar Mills • Pulverizers  
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Check 4774 opposite last page  
**CHEMICAL PROCESSING**

## NEW CONCEPT OF SAFETY AND STABILITY IN BALLMORE Safety-Step LADDERS

SECURE FEELING OF WORKERS RESULTS IN  
BETTER, FASTER WORK

The new pyramid design of BALLMORE Safety-Step LADDERS offers above-floor working safety never before available. Thirty-five models offer work levels up to fifteen feet.

Write to the Ballmore Company, West Chester 10, Pa., for the new 20-page catalog. Describes complete line of Ballmore equipment for above-floor working safety.

### MANY MODELS TO CHOOSE FROM

STEEL OR ALUMINUM



Three-step, "A" type

Casters provide finger-tip mobility. Rubber-tipped legs lock to floor when in use.



Seven-step, Handrails

CHOICE OF WIDTHS  
20" or 30" at bottom  
CHOICE OF HEIGHTS  
One to seven steps,  
steel. One to five  
steps, aluminum.

### BALLMORE "Hi-boy" SAFETY-STEP LADDERS with BALLYLOCK

Step on the pedal, two legs and non-swiveling rear casters hold ladder firmly in place while in use. Release pedal, ladder rolls easily to location of next job.



Eight-step, work levels  
up to twelve feet.

### TOP PRODUCTION WITH SAFE, CONVENIENT WORK PLATFORMS AND HYDRAULIC LIFTS



Fixed and adjustable-level work platforms and mobile access lifts available in many sizes. Special platforms and lifts designed to fulfill specific requirements.

**BALLMORE**  
EQUIPMENT  
FOR ABOVE-FLOOR  
WORKING SAFETY

THE  
STANDARD  
BY WHICH  
ABOVE-FLOOR  
SAFETY  
IS JUDGED

Check 4775 opposite last page

## ENGINEERING & SAFETY

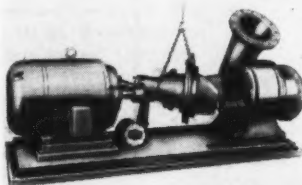
### Back pull-out design of heavy-duty pump for easy removal

Remove rotating element  
without disturbing piping

Uses: For heavy-duty pump services in chemical and pulp and paper industries.

Features: Spacer coupling between driver and pump, and special back pull-out design permits entire rotating element to be removed from casing without disturbing piping connections. Reassembly is equally simple.

Description: Heavy-duty process pumps are single-stage with end suction and vertically split casing. They



Design of heavy-duty process  
pump permits easy disassembly  
and reassembly

are available for capacities to 9000 gpm and heads to 160 ft.

Casing is of shell volute type, with drain and priming openings. Self-venting discharge at highest point in casing eliminates air binding and insures steady flow. The open, single-suction, three-vane, non-clogging impeller is cast in one piece.

(Fig 3138 and 3139 heavy-duty process pumps are products of Goulds Pumps, Inc., 37 Black Brook Rd., Seneca Falls, N. Y.)

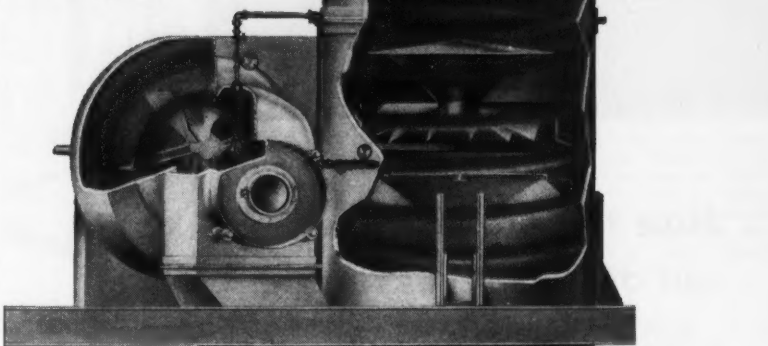
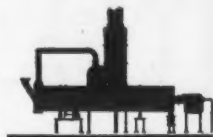
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### Keys to welding profit

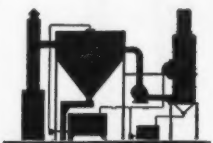
Pointing out seven key factors making use of welders profitable, eight-page booklet on welding equipment stresses features and manufacturer's dealer service. Form D761 — Caterpillar Tractor Co., Peoria, Illinois.

Check 4777 opposite last page.

## WET DUST CONTROL



PATENT PENDING



The Ducon Centrifugal Wash Collector, Type UW-4, is a basic air scrubber with extensive applications for the wet principle collection of problem dusts and recovery fines. For maximum collection efficiency of extremely fine dusts under the most varied conditions... such as in high dust loading and for abrasive dusts... this unit has proved unexcelled in many types of industrial processes. Unitized construction, precision shop-fitted parts and integrated fan assembly provide simple, rapid installation into the normal processing system.

Write today for descriptive Bulletin No. W-7456



the name in DUST CONTROL  
**THE Ducon COMPANY INC.**

147 EAST SECOND STREET • MINNEAPOLIS, MINN.

Sales Representatives in Principal Cities

In Canada: The Ducon Company of Canada, Ltd., 100 King Street West, Toronto, Ontario

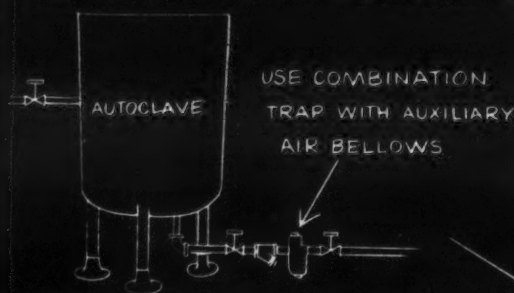
Designers and Manufacturers of Dust Control Equipment

CYCLONES • CENTRIFUGAL WASH COLLECTORS • VALVES

Check 4778 opposite last page



## STEAM TRAP CLINIC #2



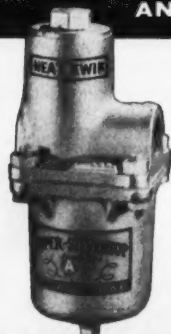
### How to get more work out of steam vessels

Here's how to increase production from steam units like autoclaves, kettles, dryers, heaters, etc., by proper trap selection. Use an Anderson dual-orifice Heat-Kwik Trap. Heat-Kwik Traps will heat up a unit  $2\frac{1}{2}$  times faster than a conventional trap. Here's how: Most traps vent air and drain condensate through a single orifice. Heat-Kwicks, however, have two orifices. A conventional inverted bucket orifice drains condensate and a separate auxiliary bellows orifice handles air.

This double action results in faster purging of air from cold units, boosts production and slashes steam costs. Where fast heating up is required, always insist on Heat-Kwicks.



### ANDERSON HEAT-KWIK STEAM TRAPS



**THE V. D. ANDERSON COMPANY**  
division of International Basic Economy Corporation  
1948 West 96th Street • Cleveland 2, Ohio

Please send information on how to get more heat from steam units with your Heat-Kwik Traps.

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

**Heats Up Production Units  $2\frac{1}{2}$  Times Faster**

Check 4779 opposite last page



## recent books

reviews of current technical and reference work  
... summarized for you by authorities in the  
field with the CP staff

### Engineering Properties and Applications of Plastics

Author Gilbert Ford Kinney, Chemical Engineering Professor of the US Navy Postgraduate School, describes each of the major plastics in separate chapters. This is followed by descriptions of fabrication methods, plastics chemistry, and mechanical, electrical, optical, and thermal properties of the plastics.

The approach is to explain the different terms and methods that are used in the plastics industry. Direct comparison of the various types of plastics is minimized.

Discussed are polyethylene, PVC, polystyrene, the acrylics, other vinyl-type plastics, the cellulose, phenolics, amino plastics, polyesters, polyamides, epoxies, silicones, and natural and synthetic rubbers. Total pages: 278.

To obtain "Engineering Properties and Applications of Plastics" remit \$6.75 direct to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, New York.

Check 4780 opposite last page.

the few half-tone illustrations do not reproduce very well. The volume is  $8\frac{1}{2} \times 11$  inches in size and three inches thick. It has been well cross-referenced.

To obtain "Scientific Encyclopedia, 3rd Edition" remit \$30 direct to D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N. J.

Check 4781 opposite last page.

### Comprehensive Inorganic Chemistry

VOL. VI  
Reviewed by  
DANIEL MEYER  
Blacksburg, Virginia

The first part of this volume, by John F. Suttle, deals with the alkali metals and their compounds. Second part, by Robert C. Brasted, discusses hydrogen and its isotopes. Volume is sixth, in a planned series of eleven, edited by M. Cannon Sneed and Robert C. Brasted.

Format of first part, from which the formal chapter divisions have been omitted, is admirably suited to the order in which the subject matter is treated. An introductory section which discusses source, separation, and properties of the individual alkali metals and their alloys is followed by a section on chemical properties of the metals and their salts in liquid ammonia.

Compounds of the metals, their chemical and physical behavior, and methods of preparation are discussed in a section which presents the various compounds in the alphabetical order of their anions.

The treatment of some of the better-known compounds is quite detailed. Many of the lesser-known compounds and the more unusual reactions

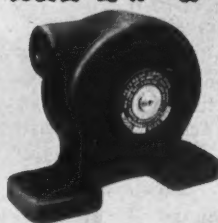
### Scientific Encyclopedia

The third edition of what has become a "standard" reference work for all those who have occasion to need information on the sciences and in engineering subjects, defines and explains about 15,000 terms of fundamental interest in these areas.

The editors have brought this massive 1840-page volume to be as up-to-date as "Sputnik II". There are about 1400 illustrations, including over a dozen in full color. The reviewer's only criticism is that

# VIBROLATOR®

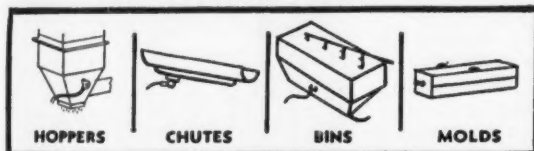
the strong  
silent type  
VIBRATOR



## FOR MOVEMENT OF WET OR DRY MATERIAL

One moving part does the job — a rolling ball driven by compressed air. Needs no oil or filters. The VIBROLATOR moves materials down chutes, out of hoppers, actuates screens, brings up entrained air in wet plaster or concrete, available in 14 sizes, priced from \$12 to \$150, from "pocket-watch" size to the new 28 lb. UCV-64, ideal for vibrating RR hopper cars. Write for catalog today.

**MARTIN ENGINEERING COMPANY**  
155 Kemp Street • Neponset, Illinois



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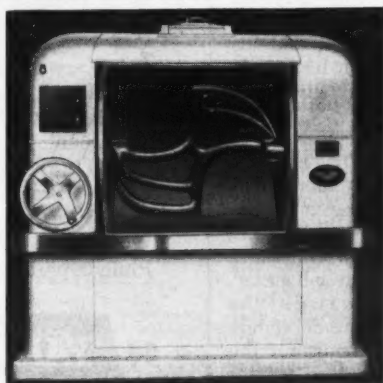
## Boost your production with



**CHAMPION'S**  
Famous  
*Sigma*  
Spiral Arm  
MIXING  
AGITATOR

For fast, intimate, uniform mixing of heavy, viscous ingredients. It blends and incorporates the different materials in a homogeneous mixture with economical use of power.

The Sigma Arm is an integral feature of the Champion Type "H" single and two speed mixers shown below. Several sizes with capacities up to 240 gallons, adapted for many uses. Champion also offers vertical mixers made in capacities from 20 qts. to 140 qts., 3 and 4 speeds. Tell us your requirements — we'll send you complete details.



Makers of a full line of modern bakery equipment and special compounding mixers since 1888.

**CHAMPION MACHINERY CO., JOLIET, ILLINOIS**

Check 4783 opposite last page

## RECENT BOOKS

are merely located in the chemical literature by an extensive bibliography, for the textual presentation of the subject matter is richly supplemented by almost 400 direct literature references. In addition, there are scores of tables and excellent phase and solubility diagrams culled from the literature.

Such an economy of treatment makes this section of 187 pages, though comparatively small, an excellent reference supplement for graduate students, researchers, and technical directors who are seeking specific information on the alkali metals.

Short section on the analytical chemistry of the alkali metals seems inadequate at first glance, but many new and valuable methods of analysis are presented by short introductory statements which are keyed to the extensive bibliography.

Second part of volume discusses the occurrence, preparation, and chemical and physical properties of hydrogen, deuterium, and tritium. The short forty pages of text and tables can do no more than serve as introductory statements to the lengthy bibliography.

To obtain "Comprehensive Inorganic Chemistry, Vol VI", remit \$6 direct to D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 10, N. Y.

Check 4784 opposite last page.

## Gas Chromatography

Reviewed by  
NATHANIEL BRENNER  
The Perkin-Elmer Corp.  
Norwalk, Conn.

This 217-page work by Dr. A. I. M. Keulemans, a noted pioneer in the development of this revolutionary analytical technique, provides both a superb general text for introduction to the field and a working manual for the investigator applying gas chromatography to specific laboratory problems.

An excellent discussion of theory of the chromatographic process is included, as well as

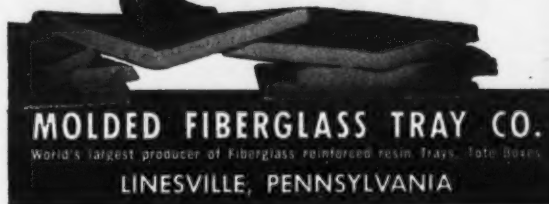
## LIGHT BUT SO STRONG!

**TOTELINE**  
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TRAYS

For Drying:  
**CHEMICALS**  
**PHARMACEUTICALS**  
**ANTIBIOTICS**

They're feather-light, but they're durable and sturdy as any trays you've ever used! What's more, the large inside corner radii makes them very easy to clean. And, because fiberglass does not absorb heat, the materials dry faster in Toteline trays. Many sizes available. Write

TOTELINE  
Wherever  
materials  
are handled



**MOLDED FIBERGLASS TRAY CO.**

World's largest producer of Fiberglass reinforced resin Trays. Toteline Trays.

LINESVILLE, PENNSYLVANIA

Check 4785 opposite last page

## Optimum Chemical, Beverage, Food Payload with Litewater Portersville Stainless Tanks



Engineered to eliminate every ounce of needless weight for optimum payload. Exclusive Portersville reinforcing rings at stress points assure you of extra mileage per tank. Portersville micro-smooth stainless steel tank interiors exceed sanitary requirements while cutting cleaning costs.

Send your tractor data and commodity requirements to our engineering department. We'll send you a Portersville Loading Diagram designed to fit your requirements.

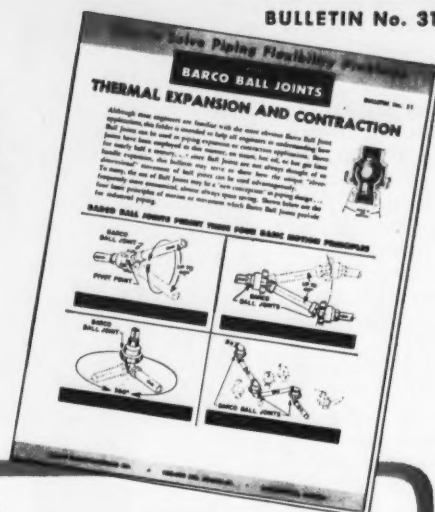
**Portersville Stainless Equipment Corp.**

PORTERSVILLE (BUTLER COUNTY) 10, PA.

Check 4786 opposite last page

# EVERY ENGINEER will want a copy of this NEW BULLETIN

BULLETIN No. 31



HOW TO SOLVE

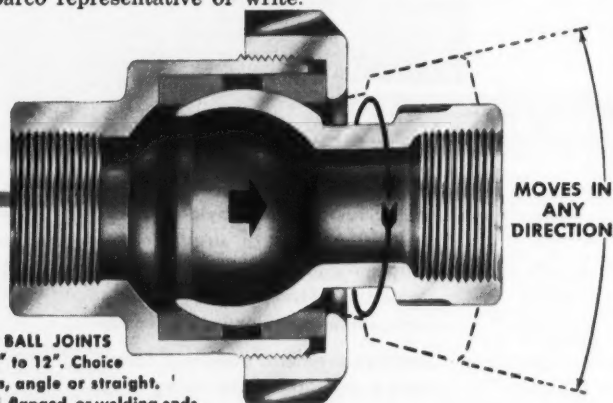
## PIPE EXPANSION

PROBLEMS

**C**ERTAIN distinctive characteristics and features make Barco Flexible Ball Joints particularly well-suited for solving many present-day plant piping design problems, especially for *Steam Service*:

1. Ability to handle compound movement (where twisting is combined with thermal expansion and contraction).
2. Virtually no deterioration. Able to stay in service for years without repairs or maintenance. No lubrication.
3. No heavy pipe anchoring required. No "end thrust" developed under pressure. Minimum space needed for installation.
4. Maximum safety for high temperature applications. All-metal construction available. Special metals can be specified.
5. Basic design is pressure sealing against leakage and self-adjusting for wear. Suitable for steam pressures to 750 psi and higher.
6. Easy to engineer joints into piping to provide for any degree of flexibility, expansion, or movement required.

New Bulletin No. 31 contains interesting diagrams showing how to solve many common pipe expansion problems **EASILY, ECONOMICALLY**. Ask for a copy; see your nearest Barco representative or write:



**BARCO BALL JOINTS**  
Sizes 1/2" to 12". Choice  
of styles, angle or straight.  
Screwed, flanged, or welding ends.



**BARCO MANUFACTURING CO.**  
537-E Hough Street • Barrington, Illinois

The Only Truly Complete Line of Flexible Ball, Swivel, Swing and Revolving Joints  
In Canada: The Holden Co., Ltd., Montreal

## RECENT BOOKS

a comprehensive study of design and applications of gas chromatography instruments. Over 100 figures, including many facsimilies of actual chromatograms, aid in illustrating these applications and principles.

Other chapters are specifically devoted to intensive discussion of the role of the mobile phase, that of the stationary phase, and that special side-branch of the field, gas-solid chromatography. One very useful appendix contains a listing of useful column substrates, with notes on their stability and reported applications. A second appendix is devoted to an intensive discussion of katharometer (thermal conductivity cell) design.

Copious references to important and recent American as well as European literature on the subject follow each chapter. Fine editing by C. G. Verver and clear printing and figure reproduction serve to complete what must be considered a brilliant treatment of this growing field.

To obtain "Gas Chromatography," remit \$7.50 direct to Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y.

## Human Understanding in Industry

This 112-page handbook for supervisors explains why employees act the way they do, discusses the relationship between the supervisor and his men, and cites what he can do to make the men give him their best.

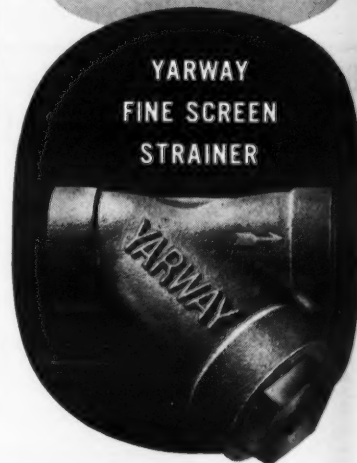
Written by Dr. William C. Menninger and Dr. Harry Levinson of the Menninger Foundation, it presents a realistic, practical view of how the human personality functions.

Illustrated with charts, graphs, and drawings, the book uses factual, understandable material to bring out the important points. It discusses the quiet, efficient, but withdrawn worker; the excuse maker; the accident prone;



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Check 4788 opposite last page  
CHEMICAL PROCESSING

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## A package for pollution control

Here is a compact package that will meet your requirements and code requirements for air pollution control and will reclaim valuable by-products in processing.

So simple and so efficient are Schneible Multi-Wash Collectors and slurry tanks, that they continuously earn money for chemical processors.



For product purity control, Multi-Wash units are fast becoming necessary process equipment.

Get details on this package for profitable pollution control. Write or wire for complete information.

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Refer to Sweet's File No. 1e/Sc

Check 4789 opposite last page

APRIL 1958

## RECENT BOOKS

the complainer; and the buck passer.

Book is the outcome of thoughtful evaluation and the assistance of over 100 persons in business and industry. In an experimental form it has been used successfully in a number of supervisor-training programs. A Leader's Guide, for use in conducting group discussions, is also available. We recommend the handbook as a "must" for all supervisors.

To obtain "Human Understanding in Industry", remit \$2.25 direct to Science Research Associates, 57 West Grand Avenue, Chicago 10, Illinois.

Check 4790 opposite last page.

### Qualitative Testing and Inorganic Chemistry

This 488-page volume is designed as a college textbook. The author, Joseph Nordmann, devotes the first half of the volume to general chemistry, and the second half to qualitative inorganic analysis. The book is designed for use in both laboratory and lecture sessions.

To obtain "Qualitative Testing and Inorganic Chemistry" remit \$6.25 direct to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y.

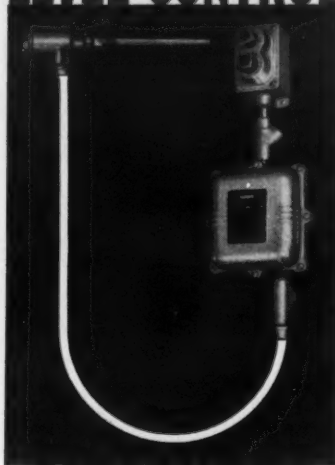
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### Higher Oxo Alcohols

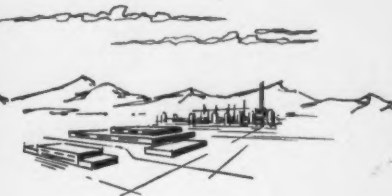
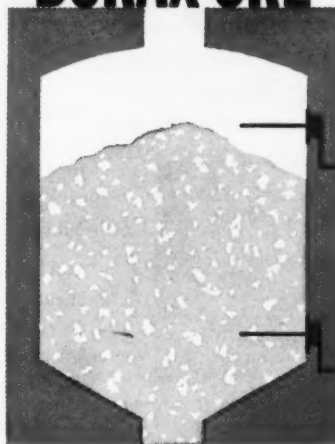
The catalytic combination of olefins, carbon monoxide, and hydrogen to form aldehydes and alcohols is called the oxo reaction. Since the first US patent was granted in 1943, production of higher oxo alcohols (the most important oxo derivative) has reached the 150-million-pound-per-year mark; and except for patents, little has been written on this increasingly important subject.

Lewis F. Hatch of the Enjay Laboratories has now brought together the first book completely reviewing this reaction. The book has 120 pages, and should be of value to those working with plasticiz-

## TEKTOR® LEVEL CONTROL



**MEASURES  
GRANULAR  
SOLIDS  
LIKE  
BORAX ORE**



At the sprawling U. S. Borax & Chemical Corp. refinery in Boron, Calif. Robertshaw-Fulton Tektor Level Controls keep watchful, automated eyes on the crude borax ore as it moves from the pit bottom into the refinery's giant thickeners, crystallizers and dryers to eventually emerge as derivatives used in heat-resistant glass, gasoline and in rocket fuel research.

Installed as high and low level controls in each of the huge receiving tanks, the R-F Tektors indicate automatically when the ore has reached a predetermined level. A built-in relay-actuated switch operates motor-driven valves and pumps to switch the feed from one tank to another.

Installed more than six months ago, U. S. Borax engineers report the instruments have been operating with extreme accuracy and have required no maintenance.

Thousands of Tektor Level Controls are now in use throughout the world, operating in various liquids, powders, granular and bulky materials and under almost all conditions of temperature, pressure or vacuum. The unit is available in four different types of enclosures including an approved explosion-proof type for hazardous locations. For further information write for Technical Bulletin F-101-4.

Other Tektor applications: Liquids, including water, acids, alkalis, oils and viscous liquids; powdered materials and bulky solids.

AERONAUTICAL AND INSTRUMENT DIVISION

**Robertshaw-Fulton**

**CONTROLS COMPANY**

SANTA ANA FREEWAY AT EUCLID AVENUE • ANAHEIM, CALIFORNIA

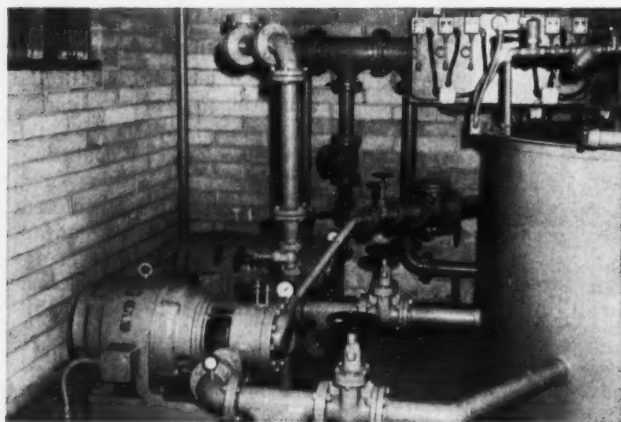
Check 4792 opposite last page



A hippo surfaces with a cavernous yawn—powered by water from F-M pumps shown below.

## From butterflies to hippopotami

F-M pumps make animals "live"



In one of the world's most fabulous amusement parks, waterfalls tumble; rivers flow; hippos yawn, and giant butterflies flap their wings—all water-powered by Fairbanks-Morse pumps with F-M motors.

Although a most unusual application, these F-M installations demonstrate the flexibility and experience of Fairbanks-Morse in working with the engineers of any organization.

Whatever type, size or capacity pumps you need—you're sure of satisfaction when you call in your F-M Sales Engineer. Contact him today, or write directly to Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois, Dept. CP-4.



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Check 4793 opposite last page

## RECENT BOOKS

ers, detergents, synthetic lubricants, and herbicidal esters. The book contains 409 references, 18 tables, and 26 charts and drawings.

To obtain "Higher Oxo Alcohols" remit \$4.50 direct to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, New York.

Check 4794 opposite last page.

## Source Book of Industrial Solvents VOL. II

This volume covers the production and the physical properties of halogenated hydrocarbon solvents. It is the companion volume to the "Handbook of Solvents," published a few months ago, which covered pure hydrocarbons. The name of the series has been changed to avoid any confusion with other books in the field.

The volume is 268 pages thick and discusses the halogens themselves, as well as fluorinated, chlorinated, brominated, and iodinated hydrocarbons. Ibert Mellan is the author.

To obtain "Source Book of Industrial Solvents, Vol. II" remit \$7.00 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.



"... A modern miracle gentlemen—one that will revolutionize the industry — a nylon bearing sheep!"



REFINING



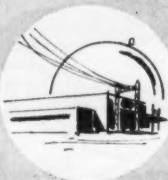
CHEMICAL



POWER PLANTS



PHARMACEUTICAL



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PULP AND PAPER



FOOD PROCESSING



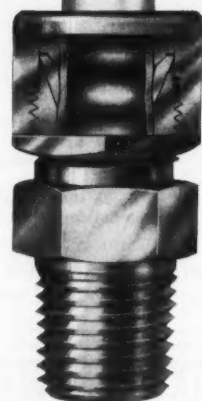
LABORATORIES  
AND PILOT PLANTS



INDUSTRIAL

Where only the finest is good enough

**Swagelok®**  
TUBE FITTINGS

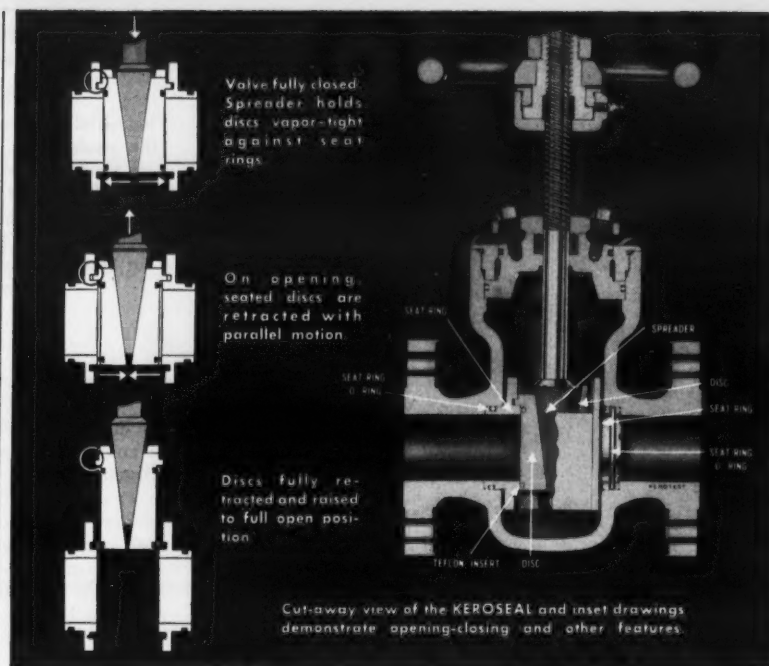


In use wherever top performance is demanded. Swagelok Tube Fittings provide a leakproof, torque-free seal. Your Swagelok Specialist will welcome the opportunity to work with you on your particular fitting requirements. For information, write Dept. C2.

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Check 4795 opposite last page

APRIL 1958



## Where can you use the New **KEROSEAL®** Valve?

More than two years of laboratory and field testing prove that the new KEROSEAL offers advantages not found in any other valve. These include the following:

- It is vapor-tight, mechanically sealed
- Non-lubricated
- It provides optional direction of flow
- Full opening
- It is designed to handle gases, petroleum products, petrochemical fluids

Where can you use the KEROSEAL? We invite your inquiries and will gladly discuss your problems in full.



**KEROTEST  
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COMPANY**

Kerotest Cast Steel Valves Are Manufactured and Distributed in Canada Exclusively by Guelph Engineering Company, Guelph, Ont.

New **KEROSEAL** Bulletin available on request

**KEROTEST MANUFACTURING COMPANY**  
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Gentlemen: DATE \_\_\_\_\_ 1958  
We are interested in the possibility of using KEROSEAL. The fluid is \_\_\_\_\_, under pressure of \_\_\_\_\_ psi (or psig) and a temperature of \_\_\_\_\_ ° C.(F.) We understand we are under no obligation in requesting full information.

NAME \_\_\_\_\_ POSITION \_\_\_\_\_  
COMPANY \_\_\_\_\_  
STREET \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_



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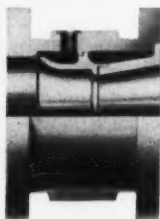


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presents the new  
**TWIN-THROAT**  
(TRADEMARK)  
**Venturi Tube**  
PRIMARY DIFFERENTIAL  
PRODUCER FOR FLOW  
MEASUREMENT  
*the advantages are amazing!*

Compare  
the laying  
length

CONVENTIONAL      "TWIN-THROAT"

Highest efficiency in the shortest laying length—less weight—easier to handle and install and low cost. Laying length is identical for each line size regardless of throat area ratio. Based on modern hydro-dynamic principles, the new "TWIN-THROAT" Venturi produces a higher differential pressure for a given throat than is possible with ordinary types—without increasing the head loss.



50531

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THE ONLY COMPANY impartially offering equipment for ALL types of water and waste processing—coagulation, precipitation, sedimentation, flotation, filtration, ion exchange and biological treatment.

Check 4797 opposite last page



## new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc., are found throughout other sections of this magazine

### Paper air filter

Paper filter designed for use in combination with most impingement-type panel filters to remove particles and smudge-type pollutants from high velocity air streams is subject of four-page bulletin. Features, construction, and specifications are covered. Bul B-1300-2 — The Farr Company, 2301 East Rosecrans, El Segundo, Calif.

Check 4798 opposite last page.

### Describes oil heater

Folder of four pages points out unique features of manufacturer's oil heaters applicable to many industries where heating temperatures up to 500°F are required, and operation at low pressures is desirable. Form RE-363 — Bros Incorporated, 1057 Tenth Ave., S.E., Minneapolis 14, Minn.

Check 4799 opposite last page.

### Gas chromatographs

Three data sheets on gas chromatographs describe features, specifications, and other pertinent data. Data sheets 715-A, 727, and 728 — Scientific Instruments Div., Beckman Instruments Inc., 2500 Fullerton Road, Fullerton, Calif.

Check 4800 opposite last page.

### Develop rate shortcut

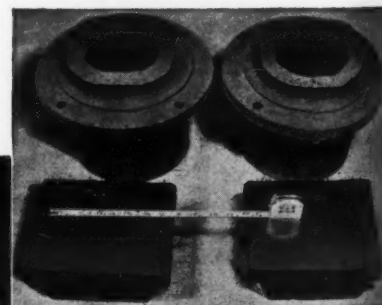
A rate analysis firm has developed a rate shortcut for freight moving via scheduled truck lines between the Chicago commercial area and every city east of the Rockies. It gives shippers a handy, quick-reference for rating



## GET 5 TIMES Longer Valve Life with Colmonoy Hard-Facing

Catalyst slide valve gates, throats, and bodies last up to five times longer when hard-faced with Colmonoy No. 1 electrodes. The success of Colmonoy No. 1 in resisting erosion by catalytic fluids has made it the standard material for hard-facing slide valves by many maintenance shops, job shops, and valve manufacturers.

Colmonoy No. 1 electrodes have a new metallic coating that improves arc stability, permits vertical welding, and eliminates weld cleaning between successive passes. This reduces welding time to cut the already low cost of reclaiming valves with Colmonoy hard-facing.



Two 8 inch slides and throats after being reclaimed with Colmonoy No. 1 (shown finish ground)



A valve slide being hard-faced with Colmonoy No. 1 electrodes.

Write for Colmonoy Hard-Facing Manual #79 for more about Colmonoy hard-facing alloys and methods.

**HARD-FACING & BRAZING ALLOYS**  
**WALL COLMONOY CORP.**  
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Check 4801 opposite last page

CHEMICAL PROCESSING

## NEW LITERATURE

shipments without turning to voluminous tariff files. Rate shortcut is packaged in 5 x 8" leatherette container, consisting of rate base booklet and one or more slide rules, depending on number of states a company ships to-or-from. To obtain rate shortcut booklet, remit \$7.50 (slide rules cost \$1 per state) direct to Speed-O-Rate Co., 914 Marquette Ave., Minneapolis, Minn.

Check 4802 opposite last page.

### Electronic equipment cat

Containing 1584 pages, the largest, most comprehensive catalog ever published for the electronic industry is now available in its 1958 edition. Over 150,000 items of 350 manufacturers are included. Names of electronic parts distributors from which "The Radio-Electronic Master," 1958 (22nd) edition may be obtained, will be furnished on request by United Catalog Publishers, Inc., 60 Madison Ave., Hempstead, N. Y.

Check 4803 opposite last page.

### WANT MORE INFORMATION . . .

. . . about things you read about in the New Literature Section?

#### Here's How To Get It

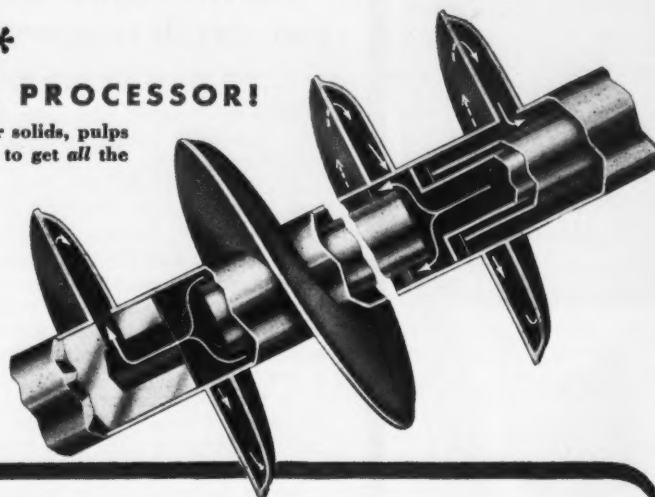
Note the number in the last line of each new literature review. Check this key number on Reader Service slip opposite last page of this issue. Fill in the slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department. We will contact the manufacturer for you, telling him you'd like a copy of the bulletin. He'll send it direct to you.

if you have a Cooling... Heating... or Drying problem  
investigate the revolutionary advantages of...

## THE holo-flite<sup>\*</sup> PROCESSOR!

If you have processes where slurries, granular solids, pulps or pastes are cooled, heated or dried, be sure to get all the facts on HOLO-FLITE advantages.

HOLO-FLITE handles such processes — in continuous flow — in as little as 1/5th the space of other types of heat exchangers. What's more, it is readily adaptable to a wide range of applications — is simple to install and maintain — and provides many other important savings.



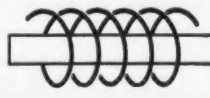
### typical HOLO-FLITE advantages...



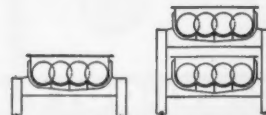
**ITS APPLICATION FLEXIBILITY** is almost unlimited. It cools, heats, or dries. It handles granular solids, pulps, pastes, slurries and fluids with equal ease. Its heat transfer agent can be water, refrigerant, hot oil, Dowtherm, steam or other liquids or vapors at any of a wide range of temperatures. It cools materials in ranges from 1800°F to 0°F. It heats and dries with hot oil to 600°F...with Dowtherm to 750°F...with steam to 150 lbs. per sq. in. pressure.



**THE LARGE HEAT-TRANSFER SURFACE** saves space — HOLO-FLITE requires as little as 1/5th the space of other heat-exchange equipment of comparable capacity. Moreover, a more complete heat transfer is effected, resulting in more uniform processing.



**ROTATION IS SLOW** — granular and powdered solids are handled with practically no dusting — negligible abrasion. There are no dust recovery problems — a further saving in installation, maintenance and operating costs!



**ITS OPERATING CAPACITY** is readily adaptable to virtually any requirements by simply varying the diameter, pitch, and length of flights, as well as the number of "tiers." Multi-tier units require no more floor space than single-tier installations!

Send for a Free 8 Page Bulletin which gives further time, space and money-saving details on Holo-Flite installation and operating advantages!



\*T.M. Reg. (HOLO-FLITE)



### HOW HOLO-FLITE WORKS...

Basically the HOLO-FLITE consists of one or more flights of hollow-bladed screw conveyors. The product to be processed moves through a trough housing the conveyor screws. The heat-transfer fluid circulates through the hollow blades and shafts of the conveyor. The product is constantly rotated into, around, under and over the blades and shafts through which the heat-transfer fluid is circulating, assuring quick, uniform heat passage between the two mediums — as the product is continuously moved along in a bulk-flow without interruptions!



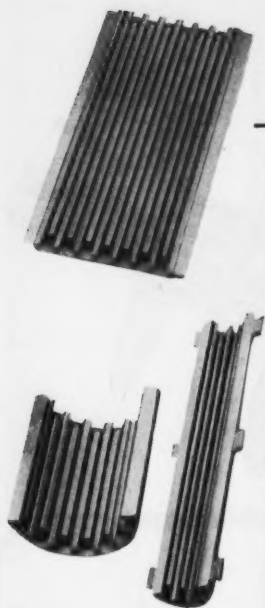
COTTRELL Electrical Precipitators  
MULTICLONE Mechanical Collectors  
CMP Combination Units  
DUALAIRE Jet-Cleaned Filters  
HOLO-FLITE Processors  
HI-TURBIANT Heaters

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Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries  
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## Heating units you can adapt to your specific requirements

Hevi-Duty Heating Units are a convenient source of clean, uniform heat for many industrial or chemical processes. They are widely used for keeping sodium and salts in liquid state as well as for countless other heating operations.

Semi-cylindrical units are ideal for heating straight lengths of pipe or tubing. Flat units may be used with coils exposed or muffled and can be arranged to provide a flat heating surface or grouped to form a box. Both shapes are available in a wide range of sizes and a choice of two temperature ranges — to 1800° F. and to 2200° F. Heating units may be contained in metal sheaths for emersion in liquids.

Write for Bulletin 158. See how easily and economically Hevi-Duty Heating Units can solve your special heating problems.

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LABORATORY FURNACES

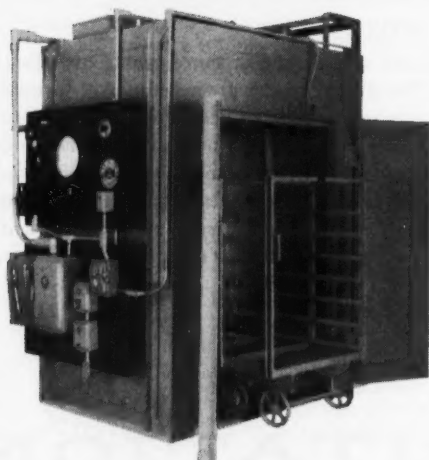


ELECTRIC EXCLUSIVELY

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## Completely Controlled for Drying Quality and Safety



No matter what the chemical nature or sensitivity of material to dry, in Rockwell Recirculating Ovens you are sure of complete product uniformity, with complete operating safety.

Standard cabinet and truck type ovens (gas, electric or steam) are available with aluminized steel interiors or with special stainless steel; fume-tight; recirculating fans are interlocked with heating system for shut-off in event of power or fuel supply failure; other safety features.

For drying, baking, curing, evaporating or finishing, Rockwell Ovens are RIGHT for you. What's your heat processing problem?

Write for Bulletins 125 & 126

### W. S. ROCKWELL COMPANY

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Check 4806 opposite last page



## NEW LITERATURE

### About Teflon packings

Impervious to acids, caustics, oxidants, and solvents, Teflon packings, offered in a wide variety of forms to suit individual requirements, are fully described in manufacturer's Cat T-57 — Belmont Packing and Rubber Co., Butler & Sepviva Sts., Philadelphia 37, Pennsylvania.

Check 4440 opposite last page.

### Vibrating equipment

Manufacturer's illustrated folder of six pages details line of vibrating screens, feeders, and conveyors. Manufacturer has been licensed by the Carl Schenck Co. of Germany to produce its complete line of vibrating equipment. Bul 1475 — Dravo Corporation, Neville Island, Pittsburgh 25, Pa.

Check 4807 opposite last page.

### Reactor safety papers

Four papers present information given at a recent industry-government conference on nuclear reactor safety. To obtain TID-7549, "Part 1 — Reactor Safety Conference," remit 75c direct to Office of Technical Services, US Department of Commerce, Washington 25, D. C.

### Teflon hose assembly

Illustrated four-page catalog supplement presents specifications, fitting assembly data, hose data, and detailed cross sectional drawings of Teflon hose assembly. Form 2M957 — Titeflex, Inc., Hendee St., Springfield 4, Mass.

Check 4808 opposite last page.

### Filter area calculator

Filter area calculator working on slide rule principle is offered free by filter manufacturer. Pocket-size device makes possible rapid determination of square feet of filter area needed in liquid-solid

Uniform  
Class 3 Fit

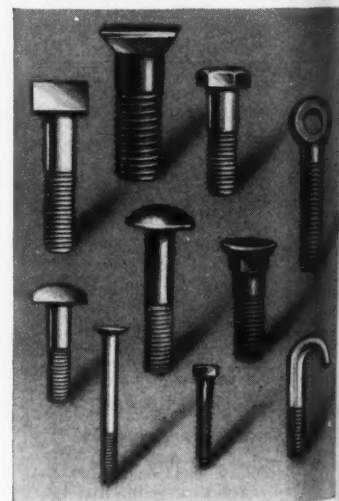
**BOLTS  
NUTS  
STUDS**



### TITANIUM

- Carbon Steel
- Alloy Steels
- Stainless Steels
- Silicon Bronze
- Naval Brass
- Monel Metal

You can depend on a uniform Class 3 fit if required when you buy Pawtucket threaded fasteners. Standard items or specialties — all Pawtucket products are accurately made in standard dimensions or to your specifications. Heat treating with precision-controlled modern equipment.



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T.M. REG.  
"The Bolt Man"

Check 4809 opposite last page

CHEMICAL PROCESSING



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HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

**A TYPE FOR EVERY USE!**  
FOR ALL PRESSURES!  
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## Standard & Double Extra Heavy UNIONS

Available with screwed or socket weld ends. 3000-lb. sizes 1/8" to 3"; 6000-lb. sizes 1/8" to 2".



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With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

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With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.



## FULL STAINLESS & FULL ALLOY STEEL UNIONS

With screwed or socket weld ends. 3000-lb. and 8000-lb. service.



WRITE FOR CATALOG 58  
showing the complete Catawissa  
line of Perfect Seal Products

**CATAWISSA VALVE AND  
FITTINGS COMPANY**  
620 Mill St. • CATAWISSA, PA.

Check 4810 opposite last page

## NEW LITERATURE

separation. Filter Area Calculator — Niagara Filters Division, American Machine & Metals Inc., East Moline, Ill.

Check 4811 opposite last page.

## Electromagnetic pump data

Bulletin of four pages contains data on manufacturer's electromagnetic pump which provides maximum flow control for high-temperature liquid metal systems. Bul GEA-6395A — Atomic Power Equipment Dept., General Electric Co., San Jose, Calif.

Check 4812 opposite last page.

## Radiochemical needs

Manufacturer's 14-page catalog lists and describes complete line of labeled compounds and isotope laboratory equipment. Radiochemical Cat — Volk Radiochemical Company, 5412 North Clark Street, Chicago 40, Ill.

Check 4813 opposite last page.

## Glass pipe history

Something of the long history of glass pipe in the chemical processing industry is contained in bulletin that examines its advantages over conventional pipe. Offers information on installation. Pyrex Pipe bul — Corning Glass Works, 12 Crystal St., Corning, N.Y.

Check 4622 opposite last page.

## Low-voltage switchgear

Bulletin of 20 pages provides complete review of company's low-voltage power circuit breakers and switchboards, ranging in unit ratings from 225 to 4000 amperes. Major operating and maintenance innovations of company's new line of equipment are featured. Bul 6004-C — Switchgear Div., I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Philadelphia 30, Pennsylvania.

Check 4814 opposite last page.

## TWO DAVENPORT ROTARY STEAM TUBE DRYERS



They look alike — they rotate alike — they function alike and they are designed to do the same contact drying jobs on two highly different materials.

One is a 6' x 35' dryer constructed of type 316 stainless steel to handle a highly corrosive material which also has a contamination element. The other is a 5' x 25' dryer constructed of carbon steel to dry corn germ in a South American Corn Processing Plant.

Davenport Drying Equipment is truly tailor made to meet the exacting specifications of all types of industries including the Chemical Industry.

## YOUR PROBLEM

Our engineers will be happy to discuss your drying or cooling problems with you. For Quick Reference refer to your 1958 Chemical Engineering Catalog C page 623 or send for catalog "A"

**DAVENPORT MACHINE AND  
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Davenport, Iowa, U.S.A.

Check 4815 opposite last page

## PRATER CAN Solve YOUR! AIRLOCK FEEDER PROBLEM!

More than 2000 different Prater Airlock applications have solved processing requirements for 300 concerns. You'll find there IS a Prater Airlock for your need . . . from low pressure dust control to high pressure pneumatic conveying.



## STANDARD DUTY

Principally adapted for sealing off collectors against air leakage.

Four Sizes . . . 6", 8", 10" and 12".

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For applications involving high pressure Pneumatic Conveying or Volumetric feeding of finely ground materials.

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For pneumatic conveying systems handling flour or similar fine powder or granular material. Available for 2", 3" or 4" Conveying Lines.

Send for informative Booklet P-55  
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Check 4816 opposite last page



- Corrosion-Resistant
- Meters Acids, Alkalies, Slurries, Gases
- Extremely Short Length
- Very Low Head Loss

Request Bulletin 115-R1 describing Model DFT-PI Dall Flow Tube — the new, low cost, low-loss differential producer. Rugged insert-type unit constructed of fiberglass reinforced with epoxy or polyester resins — with corrosion-resistant metallic throat-ring and flange. Write to Builders-Providence, Inc., 387 Harris Ave., Providence 1, Rhode Island.

**BUILDERS-PROVIDENCE**  
DIVISION OF  
**B-I-F INDUSTRIES** B-I-F METERS FEEDERS CONTROLS

Check 4817 opposite last page



### ACCURATE and EASY TO INSTALL

Available in 4 Models, Petrometer Series 1400 Tank Gauges operate on the sound principle of hydrostatic pressure. No moving parts, no expensive electrical or electronic equipment. Large vertical scale gives accurate, easy-to-see reading. And construction features make installation easy.

For complete information send for Bulletin 6004

**Petrometer**  
CORPORATION

43-22 TENTH ST., LONG ISLAND CITY 1, N. Y.

Check 4818 opposite last page

## NEW LITERATURE

### For liquid processing

Lightweight, portable liquid processing equipment for filtration, mixing, storage, and pumping is described and illustrated in liquid processing equipment bul — Alsop Engineering Corporation, 1302 Alsop Square, Milldale, Conn. Check 4438 opposite last page.

### Zirconium digest

Bulletin of eight pages contains applications and properties of commercial grades of zirconium. Corrosion and physical properties are listed, and methods of fabrication are discussed. "Technical Digest on Commercial Grade Zirconium" — Columbia-National Corporation, 70 Memorial Dr., Cambridge 42, Mass.

Check 4819 opposite last page.

### Flexible coupling data

Pertinent application and selection data for flexible couplings with maximum bores ranging up to 7" and ratings from 2½ to 572 hp per 100-rpm are detailed in 12-page publication. Book 2775 — Dept. PR, Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

Check 4820 opposite last page.

### Fertilizer bagger

Bulletin of four pages contains performance and engineering data on fertilizer bagger which fills bags with pelleted, granular, and meal-type fertilizers at speeds up to 24, 100-lb bags per minute. Bul 1400—Bemis Bros. Bag Co., 305-27th Ave. N.E., Minneapolis 18, Minn.

Check 4821 opposite last page.

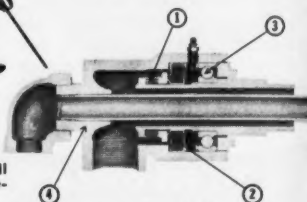
### 'Baby' filter-separator

Data file on 15-gpm filter-separator includes check list of 49 industrial and commercial liquids which can be continuously cleaned by unit.

## The ROTARY UNION'S\* 4 Vital Advantages



Here is the "inside story" on why the Rotary Union gives better and longer service.



1—Heavy Monel Bellows automatically adjusts to pressure. Keeps sealing surfaces parallel and leakproof at all times. A completely mechanical seal.

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\*Trade Name—Patented

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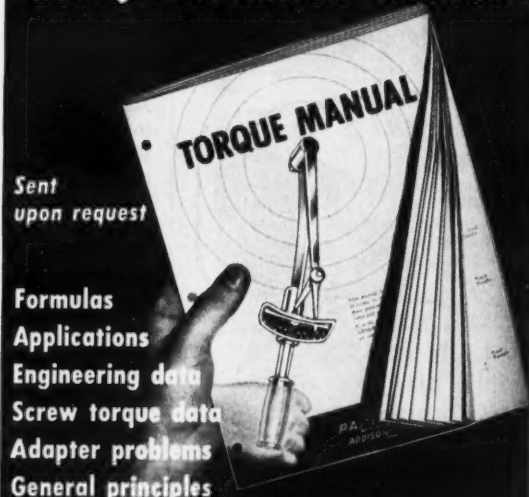
332 Atandt Ave.

Charlotte, N. C.

Baltimore—Buffalo—Camden, N. J.—Chicago—Cleveland—Los Angeles  
New York—Providence—Hamilton, Ont.—Montreal—Toronto

Check 4822 opposite last page

## "TORQUE WRENCH" MANUAL



Sent upon request

Formulas  
Applications  
Engineering data  
Screw torque data  
Adapter problems  
General principles

**P.A. STURTEVANT CO.**  
**ADDISON QUALITY ILLINOIS**

Manufacturers of over 85% of the torque wrenches used in industry

Check 4823 opposite last page

CHEMICAL PROCESSING

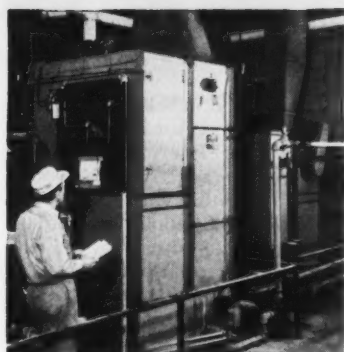
## DRY and CLEAN AIR at the RIGHT TEMPERATURE

- to control your product quality
- to protect a critical operation
- to protect apparatus from moisture damage
- to DRY your material or product
- to control packing or storage conditions
- to assure precision in testing or research
- to increase air conditioning capacity

Air Condition by the NIAGARA Method  
Using HYGROL Liquid Absorbent

This compact method, giving high capacity in small space, removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the air.

Most effective because... it removes moisture as a separate function from cooling or heating and so gives a precise result, and always. Niagara machines using liquid contact means of



drying air have given over 20 years of service. The apparatus is simple, parts are accessible, controls are trustworthy.

Most reliable because... the absorbent is continuously reconcentrated automatically. No moisture-sensitive instruments are required to control your conditions... no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.

Most flexible because... you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

Write for Bulletins 112 and 131 and complete information on your air conditioning problem.

## NIAGARA BLOWER COMPANY

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Niagara District Engineers in Principal Cities of U. S. and Canada

Check 4824 opposite last page

## DURAMETALLIC PACKINGS MEAN LONGER SERVICE, LESS FRICTION ON SHAFTS AND FEWER SHUT-DOWNS



WRITE TODAY for File No. DMCP covering a variety of types and styles of Durametallic and Dura Plastic Packings.

**DURAMETALLIC CORPORATION**  
KALAMAZOO MICHIGAN

Check 4825 opposite last page

## NEW LITERATURE

Specifications, construction, and installation advice are also covered. Filter-separator data file — Richmond Engineering Co., 7th and Hospital Streets, Richmond, Va.

Check 4826 opposite last page.

### Handles collapsible containers

Four-page bulletin describes construction and application of device for handling collapsible containers. Unit is designed to lift and carry "Sealdbins" for bulk handling flowable solids. Sketches and photographs illustrate mounting of container handler on manufacturer's fork truck. Collapsible container handler bul — Industrial Truck Div., Clark Equipment Company, Battle Creek, Mich.

Check 4827 opposite last page.

### Temperature, pressure

Nine basic types of temperature and pressure controls including self-operating regulators, water mixing equipment, pneumatic control instruments, indicating and recording instruments, and control valves are described in manufacturer's 12-page condensed catalog. Cat RB 24 — Powers Regulator Company, 3434 Oakton St., Skokie, Illinois.

Check 4828 opposite last page.

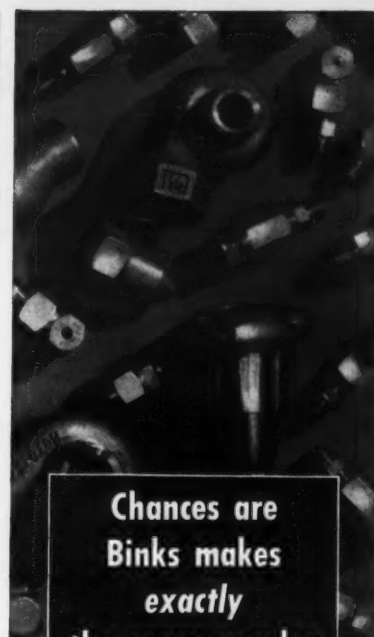
### Organic chemicals guide

Latest data on more than 350 organic chemicals is in 28-page guide. F-6136 — Union Carbide Chemicals Co., Div. of Union Carbide Corp., 30 East 42nd St., New York 17, New York.

Check 4829 opposite last page.

### Science report

National Science Foundation operations between July 1, 1956 and June 30, 1957, are presented in Seventh Annual Report. Volume of 300 pages includes information on re-



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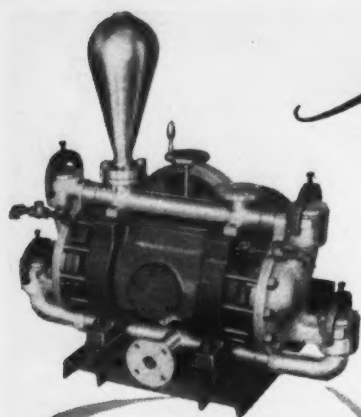
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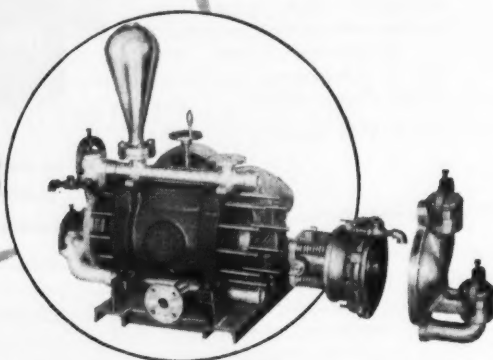
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TYPE SP-DUPLEX  
DIAPHRAGM  
PUMP  
for those  
"TOUGH"  
MATERIALS**



- Simplified drive and diaphragm support mechanism increase operating life and facilitate maintenance.
- Complete diaphragm support mechanism may be removed as a unit, without disturbing existing piping.
- Liquid ends may be removed easily for inspection and cleaning.
- Slurry blow-off protects pump in event of diaphragm failure in operation. Slurry cannot affect working mechanism.
- Adjustable stroke—optional—available for varying pump capacity; without need for expensive variable speed drive.
- Pumps at discharge pressures to 100 psi, lift of 10' of water for long periods, 15' to 18' for short periods.

Learn why this double acting, positive displacement, piston pump is right for your "hard-to-handle" service—corrosive abrasive, viscous, thick, heavy, quick-settling or sensitive. Write for Bulletin 143.

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HORIZONTAL PLATE FILTERS • CONTINUOUS THICKENERS  
SLAB FORMERS • DIAPHRAGM PUMPS • ELECTROLYTIC CELLS**

Check 4831 opposite last page

**NEW LITERATURE**

search and development effort, high-energy nuclear research, and the International Geophysical Year. To obtain Seventh Annual Report of the National Science Foundation, remit \$1.00 direct to Superintendent of Documents, US Government Printing Office, Washington 25, D. C.

**Ferrous-metal tube**

An article dealing with separate phases of ferrous-metal corrosion in the refinery field is presented in 12-page reprint. Bul TR-548 — The Tubular Products Div., The Babcock & Wilcox Co., Beaver Falls, Pa.

Check 4832 opposite last page.

**Metering pumps catalog**

File-size 36-page booklet provides users of liquid metering pumps with specifications, details on construction, and recommendations for use in handling specific chemicals, acids, and other liquids. Form 1136 — Manzel Division of Houdaille Industries, Inc., 315 Babcock St., Buffalo 10, N. Y.

Check 4833 opposite last page.

**Ball mills**

Mills for low-cost dry or wet grinding, mixing, or blending, in capacities from 40 to 13,000 lb, are described and illustrated in Cat 77 — Abbé Engineering Co., 50 Church St., New York 7, N. Y.

Check 4774 opposite last page.

**Controllers, flow meter**

Data sheets illustrate and provide pertinent information on magnetic flow meter for liquid latex measurement, and remote-set control for telemetering systems. Data sheets 783-9 (telemetering systems control) and 282-24 (magnetic flow meter) — The Foxboro Company, Foxboro, Mass.

Check 4834 opposite last page.

**Automatic  
WATCHMAN  
for  
GRINDING MILLS**



The Hardinge "Electric Ear" is the only device of its kind that controls the feed rate in grinding mills by "listening" to the sound of the rotating load.

It compensates for changes in hardness, size of feed, etc. — producing a more uniform product, increasing mill capacity from 10% to 20%, and freeing the operator for other duties.



**RELAX! Let a Hardinge "Electric Ear" run your grinding mill—and eliminate the "human element."**

**Write for Bulletin 42-A-13**

\*Reg. U.S. Patent Office

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Check 4835 opposite last page

CHEMICAL PROCESSING

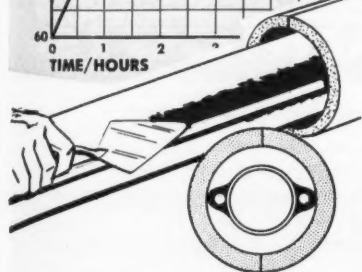
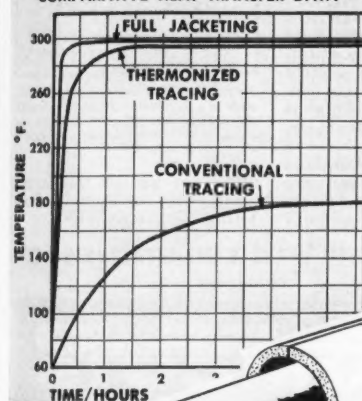
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90% for over 700 users!

### COMPARATIVE HEAT TRANSFER DATA



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Thermonizing has excellent heat transfer characteristics (see curves), exceeding steam traced equipment approximately 1100%, and closely approaching jacketing equipment. Thermon can be used almost without exception in place of expensive jacketing (and in many applications where jacketing is impossible), with savings up to 90%.

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101

Check 4836 opposite last page

## NEW LITERATURE

### Bucket elevator data

Data sheet provides detailed design and operating information, and highlights features of manufacturer's bucket elevators. Bul BEB-101 — Carpc Mfg., Inc., PO Box 3272, Jacksonville 6, Fla.

Check 4837 opposite last page.

### Compacting story

Complete story on manufacturer's compacting process, including description of compacting mill and other equipment, is contained in Bul 07B8836 — Industrial Equipment Div., Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 4741 opposite last page.

### Carbide technical manual

Manual of 20 pages features manufacturing and physical properties of tungsten carbide, its Grade selection and application, CTM-57 — Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa.

Check 4838 opposite last page.

### PVC-protected aprons, gloves, garments

Three bulletins describe polyvinyl chloride-impregnated industrial clothing. Garments, gloves, and aprons combine light weight with flexibility and resistance to corrosives and abrasion. Issued by Jomac, Inc., Philadelphia 38, Pa.

Check 4839 opposite last page.

### Radioisotope decay

Handy pocket-size booklet contains decay tables for 39 radioactive isotopes. Tables are also included for the more commonly used isotopes which list decay factor direct, without necessity of converting elapsed time into half-lives. Tech Bul DK-2 — Commercial Products Div., Atomic Energy of Canada Ltd, Ottawa, Canada.

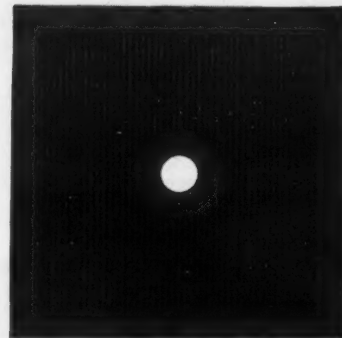
Check 4840 opposite last page.

## Anti-Corrosive WIRE CLOTH

- STAINLESS STEEL
- "NICHROME"
- "MONEL"
- PHOSPHOR BRONZE

for

- FILTER CLOTH
- SPECIAL PARTS
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Are you using wire cloth or wire cloth parts which must be corrosion resistant? Are the service conditions in your plant really tough? If you have a problem selecting the proper anti-corrosive alloy, Newark Wire Cloth may have the answer.

Available in all corrosion resistant metals, Newark Wire Cloth is accurately woven in a wide range of meshes, ranging from very coarse to extremely fine.

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for **ACCURACY**

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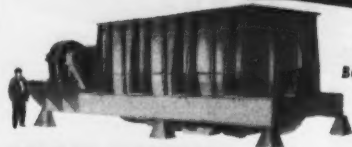
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**Newark  
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Check 4841 opposite last page

For the intimate MIXING  
of floury, powdery, granular  
and fibrous materials



Write for  
Bulletin 128.

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This equipment loads, blends, and discharges rapidly... is sanitary, dustless. Handles dry and damp materials... and liquids can be added. Ideal for the rapid, intimate mixing of small percentages of critical ingredients with a large bulk of basic material. Sizes from 1 cu. ft. to over 1,000 cu. ft. Construction materials and discharge gates to meet all applications. Available with heating, drying, and cooling attachments. Can be "adaptioneered" for special needs.

Sprout-Waldron also offers a complete line of vertical mixers. Write for details.

## SPROUT-WALDRON

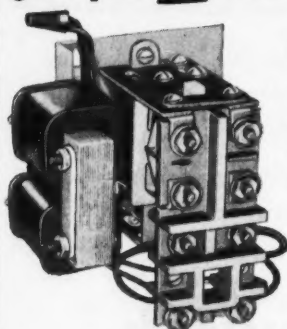
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Check 4842 opposite last page

## WARRICK Floatless Electrode Type

## LIQUID LEVEL CONTROLS...

give you all these advantages!



No moving parts in the liquid • Easy to install  
• No adjustments necessary • Unaffected by acids or caustics • Unaffected by pressure or temperature • Standard 2&3 pole units listed by U/L

Write for 32-page  
Catalog which gives  
complete specifications

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### YOU CAN USE OUR CONTROLS FOR:

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Special controls to custom requirements

## CHARLES F. WARRICK CO.

1964 W. Eleven Mile Road, Berkley, Michigan  
Dep't 9 Telephone JOrdan 4-6667

Check 4843 opposite last page

## NEW LITERATURE

### Metering, pumping

Bulletin of six pages describes machine which systematically applies pressure externally on flexible tube, thereby transmitting energy to contained liquids to produce a controlled flow. Low-cost, easily replaced pumping member is available in many types of chemically resistant rubbers and plastics. "The Kinetic-Clamp" — Corneil Associates, Rural Route 1, Thorold, Ontario, Canada.

Check 4844 opposite last page.

### Silicone rubber sheets

Properties of 50, 60, and 70 durometer silicone rubber sheets and fabric-reinforced silicone rubber sheets for -85 to 500°F applications are detailed in two-page data sheet. Bul SR-57 — the Connecticut Hard Rubber Company, 407 East Street, New Haven 9, Conn.

Check 4845 opposite last page.

### Brighter gages

Features and installation data on liquid-gage illuminator are presented in Tech Data Unit 300 — Jerguson Gage & Valve Company, 100 Adams St., Burlington, Mass.

Check 4893 opposite last page.

### Lists lab units

Laboratory equipment including autoclaves, balances, demineralizers, heaters, ovens, vacuum pumps, etc., is described and illustrated in 16-page bulletin. "Lab Log" No. 2-57 — Will Corporation, Rochester 3, N. Y.

Check 4846 opposite last page.

### Zip-up filter cloth bags

Manufacturer's flyer describes jam-proof polyethylene zip-pers now available with custom tailored filter cloth bags. Applications for bags are listed, and drawings and dia-

## TRY DARCOVA PUMPCUPS

FOR

- Higher pump efficiency
- Lower pump maintenance



Cross-section of the conventional and 45° bevel type Pumcups

IT'S a fact that hundreds of reciprocating pump and cylinder users today are standardizing on Darcova Pumcups because they eliminate fluid slippage, costly down-time and maintenance!

It's easy to check these claims right in your own plant. Behind this exceptional Darcova Pumcup performance lies texture-engineering and cup design that conform precisely to pressure-temperature-fluid conditions.

Pumcups of various types are available in a complete range of sizes and texture-engineered compositions for your reciprocating pump and cylinder requirements.

Why not get all the facts? Send today for Pumcup Bulletin No. 5503.

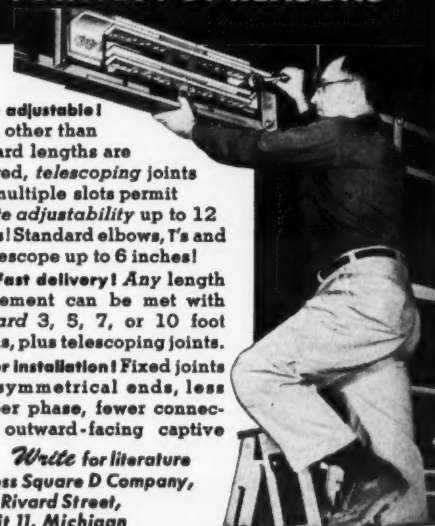
DARLING VALVE & MANUFACTURING CO.  
Williamsport 4, Pa.



TRADE MARK  
**Pumcups**

Check 4847 opposite last page

## SQUARE D's New ADJUSTABLE ALUMINUM FEED-IN DUCT FOR A LOT OF REASONS



Really adjustable! When other than standard lengths are required, telescoping joints with multiple slots permit infinite adjustability up to 12 inches! Standard elbows, T's and X's telescope up to 6 inches!

Fast delivery! Any length requirement can be met with standard 3, 5, 7, or 10 foot lengths, plus telescoping joints.

Faster installation! Fixed joints have symmetrical ends, less bars per phase, fewer connections, outward-facing captive bolts.

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Address Square D Company,  
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NOW... EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE

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Check 4848 opposite last page

CHEMICAL PROCESSING



this **NO-COST TEST OFFER**  
has **CONVINCED** thousands  
... send for **YOUR FREE**  
"TEST CAN" of C-5 "hi-temp"  
**ANTI-SEIZE THREAD COMPOUND!**



**For chemical plant uses**, on all studs and bolts exposed to temperatures up to 1800°F. such as on compressor head assemblies, hot pump studs, autoclaves, reactor flange studs, heaters, heat exchangers, "cat" crackers, stainless steel assembly.

**Try C-5 and see why leading refineries, manufacturers and power producers** have made it part of their regular preventative maintenance program.

- ✓ Ends Seizing and Galling even up to 1800°F.
- ✓ Reduces Wrench Torque
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1614-CR

### ANTI-SEIZE THREAD COMPOUND

C-5's exclusive colloidal copper formula separates mating metal threads and surfaces with cushioning, protective copper plating. C-5 prevents galvanic action and eliminates pitting even when

dissimilar metals join. On mating metal surfaces, C-5 saves gaskets and countless man hours.  
**WRITE TODAY... For Your FREE Test Sample Can of C-5.**

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Check 4849 opposite last page

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Versatile • Sensitive

#### Applicable to Lab and Plant Stream Use

Operates by measuring velocity of sound in gas

Gas	In Air	In Helium
CO <sub>2</sub>	8	1 1/4
CCl <sub>2</sub> FCa (Freon)	1	1/2
H <sub>2</sub>	5	37
N <sub>2</sub>	133	2
O <sub>2</sub>	41	2

**Convenient Sampling** • Continuous or fixed samples can be used

**Simple Operation** • No special skill required; the instrument cannot be damaged in normal use

**Low Drift** • A temperature stabilized crystal controls the frequency of oscillator to provide a drift of less than 5 divisions per hr. There is negligible drift during analysis.

Write for Bulletin 175

**NATIONAL INSTRUMENT LABORATORIES, INC.**

828 Evans St., N.E.

Washington, D. C.

Check 4850 opposite last page

### NEW LITERATURE

grams illustrate and describe zippers. Zippered filter cloth bag bul — Filtration Fabrics Div., Filtration Engineers, 155 Oraton St., Newark 4, N. J.  
Check 4851 opposite last page.

#### Describes ball valves

Ball valves for liquid and gas service, in stainless, aluminum, bronze, and steel, 1/4 through 8" — and PVC, 1/2 through 4" — with Teflon or synthetic rubber seals, are detailed in manufacturer's literature, "At Your Service" — Jamesbury Corp., 65 New St., Worcester, Mass.

Check 4426 opposite last page.

#### Shows conveyor systems

Manufacturer's unique eight-page brochure illustrates and describes applications of conveyor systems for all types of industries. Form 138-57 — J. C. Corrigan Co., Inc., 41 Norwood St., Boston 22, Mass.

Check 4852 opposite last page.

#### Covers digital recorders

Manufacturer's line of digital recording equipment, used for production testing, weighing applications, laboratory instrumentation, data reduction systems, etc., is described in six-page bul SA-81 — Clary Corporation, 408 Junipero St., San Gabriel, Calif.

Check 4853 opposite last page.

#### Packaging cost reduction

Cost reduction—from original package design to final product shipment — is subject of 24-page publication which includes pertinent advice on designing, testing, and storing of product packages. Individual case histories point up cost savings through use of specific corrugated box designs. "How to Ship More Economically in Corrugated Boxes" — Hinde & Dauch, Sandusky, Ohio.

Check 4854 opposite, last page.

**SO SIMPLE**  
**We Can**  
**Adapt It**  
**to ANY**  
**LIQUID LEVEL**  
**CONTROL JOB**

A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol.

## MAGNETROL

### AS DEPENDABLE AS MAGNETIC FORCE ITSELF

● No matter how specialized the liquid level control application, adapting Magnetrol to meet it presents no problem. Whether it's for high pressures, high temperatures, corrosive liquids or any other condition, a few "standard" modifications and the job is done! Operation is so simple no changes in basic design are needed. That's why Magnetrol "fits" practically any application — why "specials" are so often standard with us.

Because of the utter simplicity and dependability of its magnetic principle, Magnetrol has *infinite operating life*. There are no wearing parts to get out of order.

Magnetrols are available for controlling level changes from .0025-in. to 150-ft., with single or multi-stage switching. Our experienced engineering staff is at your service.

#### MAGNETROL, Inc.

WHY NOT MAIL THE COUPON — NOW

MAGNETROL, Inc., 2129 S. Marshall Blvd., Chicago 23, Illinois

Please send me catalog data and full information on Magnetrol Liquid Level Controls.

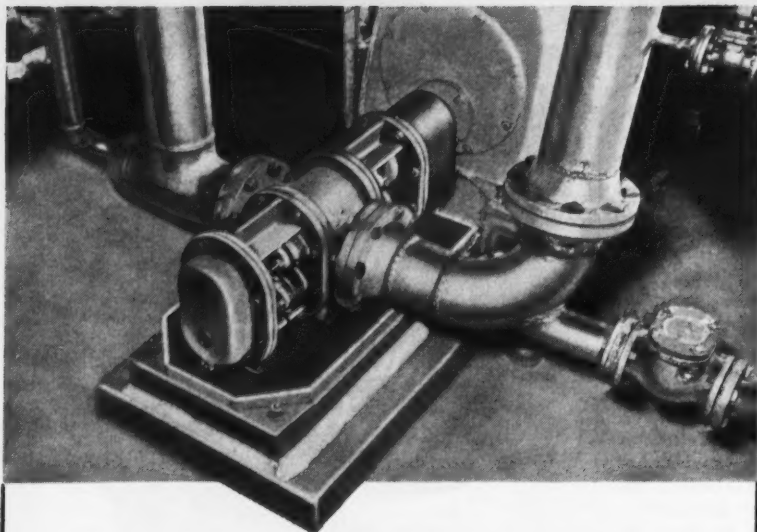
Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Check 4855 opposite last page

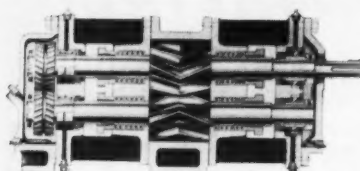


## Sier-Bath GEAREX® PUMP

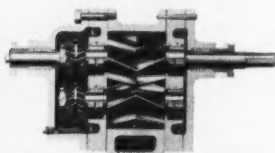
pumps viscous paste 16 to 24 hours a day  
at LEVER BROS. Sulphonating Plant

● Installed June 1955, this Sier-Bath GEAREX Rotary Pump, 208 gpm. capacity, is handling neutralizing alkaline paste having a viscosity of 9,000 SSU at 135° F., with 15" Hg suction lift at discharge pressures of 100 psig. The pump currently operates 16 hours a day, 5 days a week . . . at times has operated 24 hours a day, 7 days a week, always providing dependable, trouble-free pumping in this critical service.

### Sier-Bath "Gearex" Pumps



EXTERNAL GEAR & BEARING TYPE  
for non-lubricating liquids



INTERNAL GEAR & BEARING TYPE  
for lubricating liquids

Sier-Bath "Gearex" Pumps provide positive displacement, pulseless flow . . . quiet, vibrationless operation. Direct-connected up to 1800 RPM, they require no reduction gears. For high volumetric efficiency and long life there is no rotor-to-rotor or rotor-to-casing contact. Low pressure on stuffing boxes provides easy servicing.

Horizontal or vertical models to handle 32 to 500,000 SSU, 1 to 550 GPM at 250 PSI for viscous liquids, 50 PSI for water. Corrosion-resistant alloys, steam-jacketed bodies, water-cooled bearings, other adaptations to meet individual needs. See "Yellow Pages" for your local Sier-Bath Pump Representative or send for Bulletin G-2. Sier-Bath Gear & Pump Co., Inc., 9260 Hudson Blvd., North Bergen, N. J.

## Sier-Bath ROTARY PUMPS



Screw Pumps



Gearex® Pumps



Hydrex® Pumps

Founded 1905

Mfrs. of Precision Gears, Rotary Pumps, Flexible Gear Couplings

Member A. G. M. A.

Check 4856 opposite last page

### NEW LITERATURE

#### Oil-break starters

Designed especially for dusty and corrosive atmospheres, oil-break starters, their advantages and other pertinent data, are detailed in manufacturer's Bul 8130-CH — The Electric Controller & Mfg. Co., Div. of The Square D Company, Cleveland 28, Ohio. Check 4742 opposite last page.

#### Describes variety of stainless

Eight-page publication gives analyses of a wide variety of types of stainless steel used for sheets and plates. Gages and widths are also presented. Bul on stainless steel — Eastern Stainless Steel Corp., Dept. CP, Baltimore 3, Md. Check 4857 opposite last page.

#### Safety clean-out valve

Bulletin of four pages describes and illustrates manufacturer's valve for safe removal of water and sludge from bottom of storage tanks. Construction features, operation, and installation details are fully discussed. Bul 4004 — Petrometer Corporation, 43-22 Tenth St., Long Island City, New York.

Check 4858 opposite last page.

#### High-temp heat transfer

Bulletin of 12 pages offers pertinent information on —100° to 1000°F liquid heating and cooling systems for industrial process applications. Curves are shown for various thermal liquid heating media. Bul 200 — American Hydrotherm Corporation, 10-55 Jackson Ave., Long Island City 1, New York.

Check 4859 opposite last page.

#### Pneumatic dunnage tests

Illustrated 66-page report includes discussion of principle of pneumatic dunnage togeth-

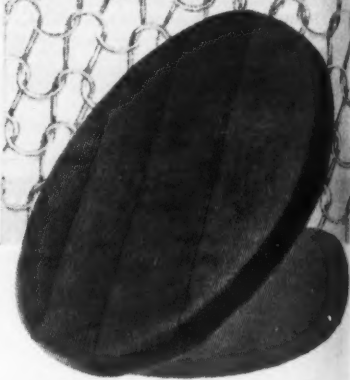
# METEX

## MIST ELIMINATORS

(ENTRAINMENT SEPARATORS)

Eliminate product loss,  
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maintenance

...at low first cost



Metex Mist Eliminators have been used successfully on many applications to knock back liquid entrainment. They are used in any vessel handling liquids and vapors when complete separation of the two phases is desired. Separation efficiency of 99%+ is maintained.

Ask Metex for engineering recommendations. Write today for Bulletin ME-6 and a data sheet.

# METEX

## METAL TEXTILE CORP.

6-175

ROSELLE, NEW JERSEY

Check 4860 opposite last page  
CHEMICAL PROCESSING

THESE VALVES  
control



Center-guided  
type for lines  
from 1" to 10".

Globe-type  
for lines  
from 3" to 24".

WILLIAMS-HAGER  
FLANGED

*Silent*  
CHECK VALVES

Surge pressures... and the resulting water hammer... are effectively controlled by these valves. Protection for pumps and piping systems is assured—a fact testified to by satisfactory service in every type of industry over a period of 28 years, in pressures up to 5,000 pounds.



Write for Bulletins:  
No. 654 on the Valves  
No. 851 on Cause, Effect  
and Control of Water  
Hammer

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146 Stanwix Street  
2 Gateway Center Pittsburgh 22, Pa.  
Our 72nd Year • 1886-1958

## NEW LITERATURE

er with detailed results of tests conducted in standard boxcars loaded with cargo and impacted at varying speeds. To obtain "Application Tests of Pneumatic Dunnage", PB-121550, remit \$1.75 direct to the Office of Technical Services, U. S. Department of Commerce, Washington 25, District of Columbia.

### For narrow aisles

Hand trucks for operation in narrow aisles, narrow aisle outrigger-type, and electric tiering trucks are illustrated and briefly described in manufacturer's Bul 201 — The Raymond Corporation, Greene, N. Y.

Check 4862 opposite last page.

### Portable potentiometer

Listing 18 main uses for instrument in laboratory and plant, six-page bulletin includes data on features and specifications of portable potentiometer for measuring temperatures and voltages. Instrument measures temperatures from -200 to +600°F, and voltages to 20.1 millivolts. Bul T-57 — Technique Associates, Inc., PO Box 91, Indianapolis 6, Indiana.

Check 4863 opposite last page.

### Conducted field tour

With the help of a fictitious guide and 20-page illustrated brochure, reader is taken on conducted field tour of field construction jobs of fabricator and erector of processing equipment. Cat 258 — Nooter Corp., 1423 S. Second St., St. Louis 4, Mo.

Check 4864 opposite last page.

### Hot process softener data

Bulletin of 24 pages deals with various types of hot process water softening equipment and contains information on conditions of water that make treatment necessary. List of chemical reactions frequently

# "NETONE" Filter Paper

- HIGH TENSILE STRENGTH
- HIGH BURST FACTOR
- ABRASION RESISTANT
- CREASE RESISTANT
- CHEMICAL RESISTANT

"NETONE" Filter Paper is a neoprene impregnated kraft paper that offers decided mechanical and chemical advantages over standard filter papers.

When compared to 60-pound unbleached kraft "NETONE" Filter Paper shows a 500% increase in wet tensile strength, wet burst factor increases from 6 to 57 and there is a marked increase in abrasion and crease resistance.

The following are a few test results indicating comparative resistance factors.

Solution	60-Pound Kraft	Wet Strength Resin	Neoprene Treated (3%)
H <sub>2</sub> O	0	72 hr.	86 hr.
10% HCL	0	6 min.	4 hr.
10% NaOH	0	6 hr.	72 hr.

Write us about your requirements and we will be glad to send samples for your testing.

... And for your filter cloth requirements we weave fabrics of treated Cotton, VINCEL†, SARAN, DYNEL, GLASS, DACRON††, TEFLON\*\*\*, POLYETHYLENE, NYLON, ORLON\*, AND POLYMAX†, Samples sent on request.

\* TM for duPont Acrylic Fiber  
\*\*\* TM for duPont Tetrafluorethylene Fiber

† TM—NFM Reg. U. S. Pat. Off.  
†† TM for duPont Polyester Fiber



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Elizabethton, Tenn.: Paul Chapman Assoc., Box 787  
Toronto: Lee Benner Chem., C. P. R. Roadway, 1119 Yonge Street

Mexico City: Maquinaria Minera, Apartado Postal 2215  
Cincinnati, Ohio: Roselawn Center Bldg.  
Houston, Texas: 1607 Jefferson Ave.  
Pensacola, Fla.: Chem-Quip Co., 1102 Texar Drive  
Montreal: Lee Benner Chem., 4700 Prince of Wales

Check 4861 opposite last page

Check 4865 opposite last page



# FILPACO

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Will help  
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particular  
filter  
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quickest service,  
latest converting  
equipment and  
most complete  
range of grades  
guarantees filter  
paper to meet  
any requirements.  
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NISHED for testing  
... or send us  
your materials for  
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synthetics cut and sewn to required shapes and sizes  
... variety of weaves, weights, finishes.

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Check 4866 opposite last page



## FULL CONE—HOLLOW CONE—FLAT SPRAY

Spraco has the most complete line of nozzles available  
anywhere — **IN STOCK**. Capacities range from 1/8 pint/min.  
to 4000 gal./min. Bronze, cast iron, and stainless steel.  
Write for our nozzle catalog.

**SPRAY ENGINEERING CO., 105 Cambridge St., Burlington, Mass.**



Check 4867 opposite last page

## NEW LITERATURE

referred to in feedwater treat-  
ment are also included. Bul  
4800 — Cochrane Corporation,  
17th St. below Allegheny Ave.,  
Philadelphia 32, Pa.

Check 4868 opposite last page.

## College-Industry Committee

An 8 1/2 x 11-inch sheet explains  
functions and organizational  
structure of the committee  
which helps colleges and uni-  
versities initiate and conduct  
material handling courses.  
Page initially appeared in the  
November issue of "The Ma-  
terial Handling Education  
News" and was reprinted for  
its informative value. "This is  
the College-Industry Commit-  
tee on Material Handling  
Education" — The Material  
Handling Institute, Inc., One  
Gateway Center, Pittsburgh  
22, Pennsylvania.

Check 4869 opposite last page.

## Pump resists corrosion

Bulletin describes and illus-  
trates construction, operation,  
and specifications of corro-  
sion-resistant glassed pump,  
of conventional hydraulic de-  
sign, for capacities up to 700  
gpm and heads up to 140'. Bul  
725.2 — Goulds Pumps, Inc.,  
Seneca Falls, N.Y.

Check 4421 opposite last page.

## Describes stainless fittings

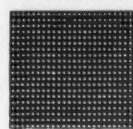
All-stainless fittings designed  
specifically for cleaned-in-  
place lines are described in  
12-page bulletin. Thirty spe-  
cific types of fittings are illus-  
trated and dimensioned. Form  
PS 9-57 — APV Company,  
Inc., 134 Arthur St., Buffalo  
7, New York.

Check 4870 opposite last page.

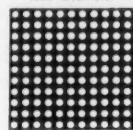
## Tungsten carbide surfacing

Product which consists of  
small hexagonal carbide but-  
tons is assembled on a flex-  
ible backing material for  
bonding on metal surfaces is

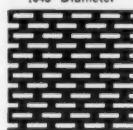
# H&K Perforated Screens



.020" Diameter



.045" Diameter



.028" x .125" Slot



No. 3 Diagonal Slot

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H&K AGENT  
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General  
Catalog

H&K perforated screens  
are furnished, to cus-  
tomer order, with holes  
accurate and uniform in  
size, shape and spacing.  
The screen resists blind-  
ing as burr-free holes are  
slightly larger at the bot-  
tom. H&K perforated  
screens can be furnished  
with margins or unper-  
forated areas in practi-  
cally any material de-  
sired.

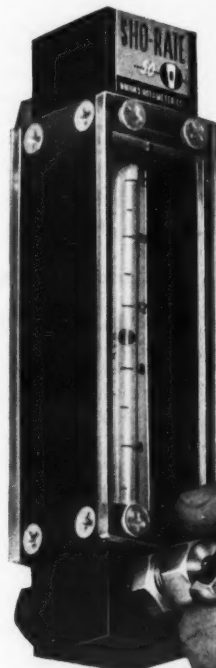
H&K specializes in the  
perforating of stainless  
steel, monel and other  
corrosion-resistant al-  
loys.

Contact either H&K office  
or an H&K agent. Let us  
work with you on your  
perforated screen re-  
quirements.

**Harrington & King**  
PERFORATING CO. INC.

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5636 Fillmore St., Chicago 44 110 Liberty St., New York, N. Y.

Check 4871 opposite last page



## NEW... an advanced concept in metering small flows

The Brooks Sho-Rate "50" is a new design idea  
in purge meters. It offers the complete inter-  
changeability, dependability and structural  
strength that's been needed for a long time.

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- Side-plate Construction
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at a very low cost. Send for complete facts.

**BROOKS ROTAMETER COMPANY**  
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WRITE FOR BULLETIN 155.



Check 4872 opposite last page

CHEMICAL PROCESSING



## CONVEYORS AND ELEVATORS

Engineered and  
built to your  
Special  
Requirements



MECO Conveyors and Elevators embody all the features and advantages gained by an extensive amount of experience in design and manufacturing over a period of one half century. Numerous installations made in the ceramic, chemical, coal, sand and gravel and other industries where handling of bulk material is required, are giving the utmost in satisfaction. Available as complete units with framing, or in component form for purchaser assembly.

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**THE MANUFACTURERS EQUIPMENT COMPANY**  
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Check 4873 opposite last page



# MAISCH

## METERING PUMPS

- STAINLESS STEEL — OILLESS BEARINGS — STERILIZABLE
- POSITIVE DISPLACEMENT — SMOOTH, NON-PULSATING FLOW
- FOR HOT, COLD, VISCOUS OR WATERY FLUIDS
- ACCURATE WITHIN 1 TO 2%

Maisch Metering Pumps are simple in design, ruggedly built for long service, and can be depended on to maintain accuracy indefinitely. Exclusive design features insure optimum performance. Particularly suited for handling chemicals, syrups, oils, glues, processing solutions, etc. Quick demountable or fixed heads. Fixed capacity pumps available in wide range of output. Pumps in stock for immediate delivery. Sanitary Metering Pumps available in capacities to 76 gph. meet all existing sanitary requirements. Write for complete details.

**MECHANICAL PRODUCTS CORPORATION**

170 North Ogden Avenue • Chicago 7, Illinois

Check 4874 opposite last page

## NEW LITERATURE

described in bulletin of four pages. Illustrations and drawings show construction and application. Instructions for figuring area coverage are included. Form B-106 — Kennametal Inc., Latrobe, Pa.

Check 4875 opposite last page.

### Desiccant-type dryer

Solid desiccant-type dryers for removing moisture from air and other gases are subject of manufacturer's eight-page bulletin. Selection charts and other engineering data and specifications are included. Bul D-106 — C. M. Kemp Mfg. Co., 405 East Oliver St., Baltimore 2, Md.

Check 4876 opposite last page.

### Lift truck power shift

Bulletin of eight pages tells and illustrates story of company's torque-converter drive for fork lift trucks. Operating advantages are described, and illustrations show operation of each unit. Bul BU-465 — Buda Div., Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 4877 opposite last page.

### Process controllers

Series of four bulletins provide full details of company's instrument line for indicating, recording, and controlling temperature, pressure, level flow, pH, etc. Tables of specifications are included with explicit statements of proportional band, reset and rate performance, spans, and adjustability. Bul series A-801 — The Swartwout Co., 18511 Euclid Ave., Cleveland 12, O.

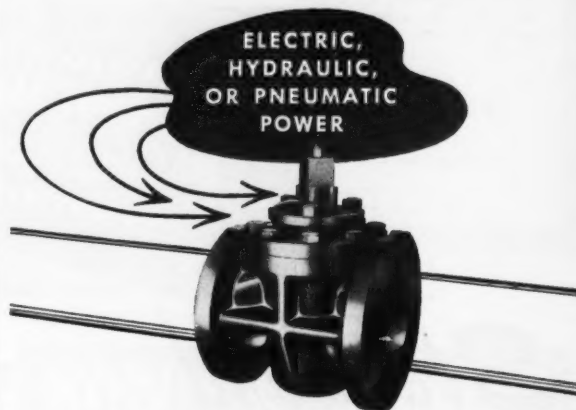
Check 4878 opposite last page.

### Synthetic resin emulsion

Spiral-bound, 64-page booklet gives details on manufacturer's synthetic PVAc resin emulsions. Thumb-tabbed sections are: description; formulating; performance; test procedures; trouble shooting;

# ROCKWELL- Nordstrom VALVES

## CUT POWER OPERATION COSTS



### 1. Rockwell-Nordstrom valves cut power operation costs two ways:

Rockwell-Nordstrom valves require simpler, less costly operators because the lubricated plug is moved through only 90° for closure.

### 2. The pressurized lubricant that assures leak-proof, positive shut-off also prevents metal-to-metal friction... the chief cause of valve wear. This means longer valve life and greatly reduced maintenance and down time costs.

Rockwell-Nordstrom valves are available in "package" units with a variety of electric, pneumatic or hydraulic actuators to meet your automatic valve needs. Rockwell-Nordstrom, the world's most complete line of lubricated plug valves, cost no more to buy—often less—than ordinary valves. Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.

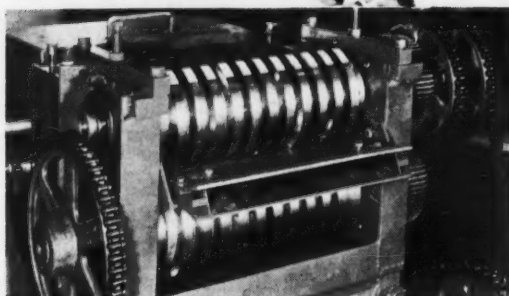
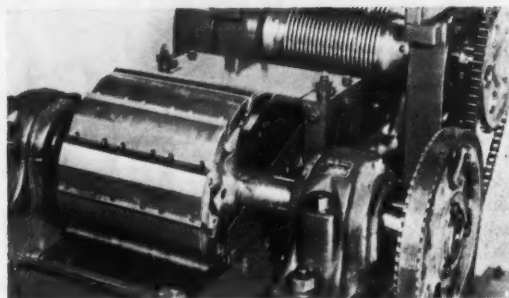
For details, just circle 4879 on the reply slip in this magazine.

ROCKWELL-Nordstrom VALVES

it's **ROCKWELL**   
MANUFACTURING COMPANY

Check 4879 opposite last page

# TAYLOR-STILES PELLETIZERS



## Standard for cutting PLASTIC & RUBBER PELLETS

Taylor, Stiles Pelletizers are fast becoming standard for pelletizing PVC, Polyethylene, Polystyrene, nylon, and other plastics and rubber, in sheet form.

The pellets are uniform in size, have clean edges, and are produced without longs, feathers, or dust.

Production rates are excellent — up to 10 tons an hour for our 700 Series Pelletizers.

Power costs are extremely low because of our shear-cutting principle and the general construction of our machines.

Due to the design of our knives, and the materials used in their construction, sharpening is infrequent and sharpening costs are held to a very low minimum.

For complete details of our Pelletizers, write today for our folders 210, 213 describing and illustrating our plastic pelletizers and 202 giving similar data regarding our rubber pelletizers.

## TAYLOR, STILES & CO.

20 BRIDGE STREET

RIEGELSVILLE, NEW JERSEY

Check 4880 opposite last page

### NEW LITERATURE

and handling. Highlight: formulation for red oxide metal primer. "Synthetic Resin Emulsions" — Plastics Div., Celanese Corp. of America, 774 Broad St., Newark, N.J.

Check 4881 opposite last page.

### On human body stress

A bibliography of 69 pages, compiled for the Air Force, surveys field of stress and fatigue and accompanying behavior and body changes appearing in literature between 1946 and 1956. To obtain PB 131299, "Selected Bibliography: Fatigue, Stress, Body Change, and Behavior", remit \$1.75 direct to the Office of Technical Services, US Dept. of Commerce, Washington 25, D. C.

### Centrifugal pump data

Manufacturer's enclosed or open impeller-type centrifugal pumps engineered to fit particular operation, whatever the consistency or type of liquid involved, are described in bulletin which emphasizes features and construction advantages. Bul 107 — Frederick Iron and Steel, Inc., Frederick, Maryland.

Check 4647 opposite last page.

### Describes sheet packings

Detailed specifications, engineering, application, and testing data on line of industrial sheet packings are contained in eight-page illustrated bulletin. Bul P-328 — Dept. CPC, Crane Packing Company, 6400 Oakton St., Morton Grove, Ill.

Check 4882 opposite last page.

### Copper corrosion resistance

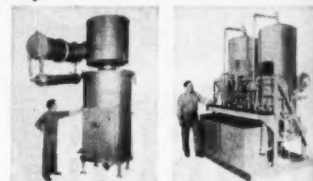
Publication of 32 pages contains findings gathered by continuous laboratory research and field study of the nature of corrosive attack on

Small roller bearings . . . some as tiny as the period at the end of this sentence are produced by Miniature Precision Bearings, Inc., of Keene, N.H. with an assist from Barnstead Distilled Water.



## Even Roller Bearings ROLL Better With BARNSTEAD Distilled Water

Barnstead Stills provide a reliable source of purest water in either laboratory or production quantities. At Miniature Precision Bearings, Inc., this is what they say: "This water Still is used in our vital laboratory work on the metallurgy of metals in our bearings and tools. A great deal of time is spent in analyzing the causes of bearing failure. . . . Dust for example, is analyzed optically and chemically. . . . Naturally, the purest distilled water is needed for much of this work and Barnstead equipment fills this need nicely."



### DISTILLED OR DEMINERALIZED?

Whatever your requirement . . . you can get exactly what you need from Barnstead . . . Only Barnstead makes both . . . Stills and Demineralizers for all Pure Water requirements. Write for literature today.

## Barnstead

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JOHNSON CITY 3113	SAN FRANCISCO Templebar 2-5391	CHATTANOOGA 6-5863

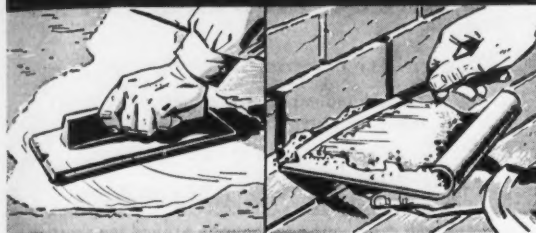
66 Lanesville Terrace, Boston 31, Mass.  
**FIRST IN PURE WATER SINCE 1878**

Check 4883 opposite last page

CHEMICAL PROCESSING



## Save Time ... Have Lasting Concrete Repairs



Patching concrete floors.

Tuck pointing masonry.

### Ready-to-Use, **NON-SHRINK** **EMBECCO PRE-MIXED MORTAR**

... Eliminates assembling, proportioning of materials. All ingredients accurately proportioned, thoroughly blended.

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**FREE** how-and-where-to-use folder. Write for it.



DIVISION OF AMERICAN-MARIETTA COMPANY  
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Check 4884 opposite last page



## INDOORS OR OUT...



### REPUBLIC PLASTIC PIPE PROVIDES ECONOMICAL CORROSION PROTECTION

In order to solve a greater number of corrosive fluid-handling problems under a wide variety of conditions, Republic Plastic Pipe is produced in two proven types.

• **REPUBLIC FE** (Flexible Polyethylene) comes coiled from 1/2- to 3-inch diameters, and in straight lengths for 4-inch and 6-inch diameters. It is well suited to applications requiring flexibility and mobility.

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Both types are low in cost, light in weight, easy to cut and join, and immune to electrolytic action. Result is economical, long-term service. Write for complete data.

**REPUBLIC STEEL**

Cleveland 1, Ohio



Check 4885 opposite last page

## NEW LITERATURE

copper and copper alloys. Included is a tabulation indicating relative corrosion resistance of principal types of copper and copper base alloys when in contact with 186 different corroding agents. Publication B-36R — The American Brass Company, Waterbury 20, Conn.

Check 4886 opposite last page.

### Digital printout

Reprint of 12 pages of technical report describes latest digital printout techniques for automatic proportioning control. "Automation In The Mill" — Richardson Scale Co., Van Houten Ave., Clifton, New Jersey.

Check 4887 opposite last page.

### Mobile gas analyzer

Complete specifications and ordering instructions on mobile, rack-mounted flue gas O<sub>2</sub> analyzer-recorder are included in manufacturer's data sheet. A useful tool to help improve combustion efficiency, instrument has many uses. Data sheet 463-61 — Leeds & Northrup Company, 4934 Stenton Ave., Philadelphia 44, Pennsylvania.

Check 4888 opposite last page.

### Describes polymer PVP

Booklet of 48 pages on versatile, high-mw polymer PVP (polyvinylpyrrolidone), describes properties and applications. PVP bul — Antara Chem., General Aniline and Film Corp., 435 Hudson St., New York 14, New York.

Check 4889 opposite last page.

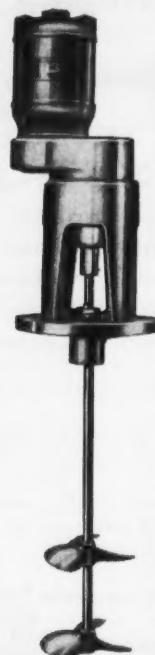
### Crystallizer info

Services of manufacturer's pilot crystallization laboratory and facilities for building suitable crystallizer installation are described in Bul CE-57 — Struthers Wells Corporation, Warren, Pa.

Check 4598 opposite last page.

## FOR PRECISION MIXING...

### Specify **MixMor**



- Gear, direct, variable speed and air drive models
- Standard speeds from 25 to 1800 RPM
- 1/4 to 3 HP
- Totally enclosed and explosion-proof motors
- Stainless steel and special alloy models

MixMor mixers are available in portable and top entering models to meet the most exacting requirements... quick delivery made from stock. For complete specifications on the MixMor for your job, write:

### **MixMor Inc.**

factory and sales office  
3139 Casitas Ave., Los Angeles 39, Calif.

Attn. Mfgs. Agents —  
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Check 4890 opposite last page

## NOW!...a Jacketed enclosed cylinder DISK FILTER



- Positive Seal
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*Jacket allows heating or cooling of product during filtration*

Incorporates the New Ertel spring-seal action which automatically maintains a perfect seal or gasket. Available with or without insulation and outer case. Also available to withstand various steam pressures.

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ENGINEERING CORP.**

Liquid Handling Equipment Since 1932

KINGSTON 3

NEW YORK

Check 4891 opposite last page

# KROIL CREEPS IN

## loosens frozen parts

18,000 industrial users depend upon this amazing new chemical tool when some frozen parts tie up valuable machinery or threaten production. They say . . .

"Kroil will loosen almost anything from an embalmer's needle to a bulldozer."

"We have excellent results loosening stuck slides on musical instruments."

"On a 25-year-old Bessemer gas engine, two bolts twisted off before . . . after using Kroil, they all came out easily."

"Before trying Kroil on heat treat trolleys we broke off every nut . . . since then, we have not lost one."

You too can get these results. Try KROIL on money-back basis. Gallen, \$4.00; with Kroil squirt gun, \$4.95, f. o. b. factory.

Ask for GENIUS AT WORK—a free publication full of ideas for maintenance men.

**KANO LABS.** 1051 Thompson Lane  
Nashville 11, Tennessee

Check 4892 opposite last page

## JERGUSON EPL-56 Gage Illuminator

**gives 3 times  
more illumination**

### Features!

- lights entire gage glass • no glare or blind spots • low cost lighting • explosion-proof • UL and CSA approved • new, one-twist lamp replacing

Jerguson EPL-56 Liquid Level Gage Illuminators give you three times the illumination formerly available . . . as well as three times the bulb life. They give a bright, evenly diffused light over the entire length of gage glass, thus enabling the operator to see liquid levels under all conditions. Easily installed on new or existing gages. Write for Technical Data Unit No. 300.

Gages and Valves  
for the Observation  
of Liquids and Levels

# JERGUSON

**JERGUSON GAGE & VALVE COMPANY**  
100 Adams Street, Burlington, Mass.

Offices in Major Cities. In Canada: Peacock Bros. Ltd.  
In England: Jerguson Tress Gage & Valve Co. In France: Pétrole Service

Check 4893 opposite last page

## NEW LITERATURE

### Profit-building ideas

Pocket-size booklet shows how many processing companies simplify production, improve products, and cut handling costs with manufacturer's evaporators, dryers, and material handling equipment. "Working for Profit" — Swenson Evaporator Company, Div. of Whiting Corporation, 15667 Lathrop Ave., Harvey, Illinois.

Check 4389 opposite last page.

### Packaged air heaters

Bulletin lists details including dimensions, features, and operation of manufacturer's packaged air heaters for providing outputs ranging from 200,000 Btu/hr to better than 30,000,000 Btu/hr at temperatures from 300 to 1500°F or higher. Bul 112 — Thermal Research & Engineering Corp., Conshohocken, Pa.

Check 4371 opposite last page.

### Metallic filter features

Metal-edge filters with flow from 1 to 1000 gpm withstanding temperatures of from -260° to 1200°F are covered in eight-page bulletin. Units can remove particles down to 25 microns. Eleven specific features are detailed. Metal-edge filter bul — Purolator Products, Inc., Rahway, N. J.

Check 4894 opposite last page.


### PVC stabilizers

Spiral-bound, 23-page technical data book tells all about stabilization of polyvinyl chloride with barium-cadmium systems. "Mark Stabilizers" — Argus Chemical Corp., 633 Court St., Brooklyn 31, N.Y.

Check 4895 opposite last page.

### Gas vs electric lift trucks

Five-page article in manufacturer's house organ covers advantages and limitations of gas vs electric power in highly unique and informative

only  Chemical Pumps  
give you this

## TRIPLE PROTECTION

### ...against corrosion

All liquid-handling parts are made of IRCAMET — highly resistant to both acids and alkalis.

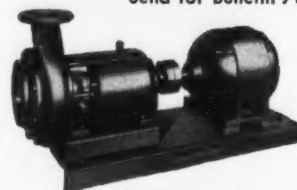
### ...against leakage

A patented LEAKCOLLECTOR stuffing-box gland drains off any seepage around the shaft.

### ...against down-time

All I-R Chemical Pumps are designed and built for easy maintenance and less of it.

Send for Bulletin 7095-A



## Ingersoll-Rand

11 Broadway, New York 4, N.Y.

Check 4896 opposite last page



## NEW NO. 460 AIR METER

BY **Dwyer**

## NOW

AN ALL-PURPOSE  
LOW-COST  
INSTRUMENT  
FOR STATIC  
PRESSURE AND  
AIR VELOCITY  
MEASUREMENTS



SUPPLY GRILLE VELOCITY



RETURN GRILLE VELOCITY



OVER-FIRE AND  
SMOKE PIPE DRAFT



STATIC PRESSURE

High and low ranges give direct velocity readings from 260 to 4000 fpm., static pressure readings from .005 to 1.0 inches of water. A complete instrument kit with every accessory needed for adjusting and balancing air conditioning, heating and ventilating equipment. The entire kit will fit in your shirt pocket.

WRITE FOR BULLETIN B-9

**F. W. DWYER MFG. CO.**

P. O. BOX 373-CP

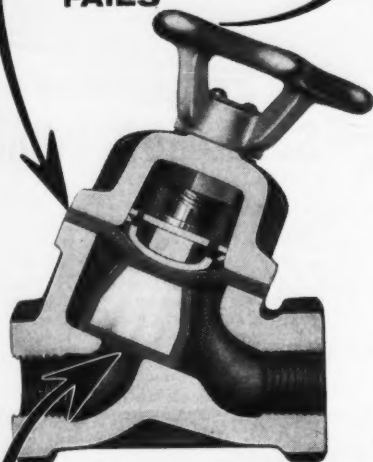
MICHIGAN CITY, INDIANA

Check 4897 opposite last page

CHEMICAL PROCESSING

# CLOSES TIGHT regardless

**EVEN IF THIS  
DIAPHRAGM  
FAILS**



**THIS DISC  
MAKES CLOSURE  
POSITIVE - SURE**

With Rockwell "D-D" Diaphragm Valves, you don't depend on the diaphragm to seal and shut-off fluid flow. This is done by the tight seating disc which will always close even should the diaphragm rupture in corrosive, abrasive, vacuum or other service.

The diaphragm serves a single purpose: to seal the valve's operating mechanism. It can be replaced without removing the valve from the line.

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**You're SURE - You're SAFE  
with ROCKWELL  
"D-D" VALVES**

**W. S. ROCKWELL COMPANY**

2208 ELIOT STREET  
FAIRFIELD, CONN.

Check 4898 opposite last page

APRIL 1958

## NEW LITERATURE

manner. "The Lift", Fall Issue — Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.

Check 4899 opposite last page.

### Mechanical seals

Features of mechanical seals reported to cut liquid handling costs in chemical applications are detailed in manufacturer's catalog. Seals for various conditions, including corrosive service, are shown. Crane Packing Company, 6421 Oakton Street, Morton Grove, Illinois.)

Check 4733 opposite last page.

### Polymerization viscometer

Bulletin of two pages describes principle of operation, features, and benefits of viscometer for polymerization and other similar processes. Bul V-1218 — Norcross Corporation, 247 Newtonville Avenue, Newton 58, Massachusetts.

Check 4901 opposite last page.

### O-ring data

Information on sizes and compounds available in manufacturer's new series of O-rings is provided in eight-page bulletin. Compounds formulated for broad range of industrial purposes, together with hardness ratings, compatibility, and temperature ranges are listed. Bul OR-57 — Chicago Rawhide Mfg. Company, 1301 Elston Avenue, Chicago 22, Illinois.

Check 4901A opp. last page.

### How to select feeder

If you have an air-lock feeder problem you will get help in solving it from "How to Select a Rotary Airlock Feeder", Booklet P-55 — Prater Pulverizer Co., South 55th Court, Chicago 50, Illinois.

Check 4816 opposite last page.

## REDUCE OPERATING COST of VACUUM SYSTEMS with this "AERO" (air-cooled) VAPOR CONDENSER

With free air the cooling medium you use the least water, evaporated in the air stream. You save the cost and pumping of large volumes of condensing water.

Air-vapor subcooling reduces mixture evacuated from the system, saving in the operation of steam ejector or vacuum pump.

This air-cooled condenser gives you more capacity than other types at a substantial saving of steam and power. Water supply, scaling treatment and disposal problems are eliminated.

You get pure condensate, an improved product; often make a profit on recovery of residues now wasted. There can be no contamination of your product at any time; it never touches raw water. Condensing, of water, of solvents or of your product, is simplified; you have one, compact,



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Condenser.  
This compact  
machine may  
be installed  
directly above  
stripping  
column or  
vacuum  
evaporator.*

easily maintained unit replacing both cooling tower and barometric or surface type condenser.

Maintenance expense is low. Balanced Wet Bulb Control provide precise, year 'round adjustment of capacity to load.

Constant temperature, uniform products and maximum production 12 months a year are assured. Unit capacities up to 15 million BTU.

Write for full information. Ask for Bulletin 129R

## NIAGARA BLOWER COMPANY

Dept. CP-4, 405 Lexington Ave., New York 17, N.Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

Check 4902 opposite last page

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Industry...*

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**Wire Mesh**

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non-ferrous metals in counts to  
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widths up to 48" in all  
commercial weaves

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76  
YEARS**

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# Ceramo®

## Thermocouple Wire

Meets  
Severe  
Conditions



### Where Durability, Hi-Temp Resistance Are Needed

"Ceramo" thermocouple wire is designed specifically for severe conditions—conditions where ordinary thermocouple wire is inadequate. "Ceramo" design, pioneered and developed by Thermo Electric, includes thermocouple material conductors with ceramic insulation and overall metal sheathing. Use this versatile wire to solve your problems of high temperature, moisture, abrasion, pressure, chemical or corrosive action, and difficult installation.

For a given application, "Ceramo" will outlast comparable standard types many times — with no significant difference in response. You can form it to almost any shape without shorting or grounding — thus simplifying installation in previously inaccessible spots. "Ceramo" thermocouples can often be used bare where protection tubes would ordinarily be needed. An enclosed hot junction "Ceramo" thermocouple will withstand pressures up to 40,000 psi.

### Available Materials

Various "Ceramo" conductors are available for temperatures from

—320°F. to 3,000°F. These include I-C, C-C, C-A, Pt. 10% Rh.-Pt., Pt. 13% Rh.-Pt. . . plus Pt. 30% Rh.-Pt. 6% Rh. Sheathing can be selected to meet the requirements of many different ambient conditions. Standard sheath materials include Stainless types 304, 309, 310, 316 and 347; Inconel; aluminum and copper. Special sheaths are made of titanium, tantalum, Hastalloy C, platinum, Monel, Chromel, Alumel, and copper-nickel alloy.

### Available Sizes

Conductors are supplied from 36 to 12 gage. Overall diameters: 2-conductor types — 1/25" to 7/16"; 4-conductor types — 1/16" to 7/16". Standard lengths: up to 30 ft. Special lengths: up to 60 ft.

Write For Catalog 31-300-R.

**Thermo  
Electric** CO., INC.

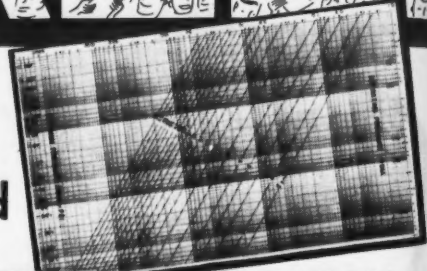
SADDLE BROOK, NEW JERSEY

In Canada: THERMO ELECTRIC (Canada) LTD., Brampton, Ont.

Check 4904 opposite last page



Send for  
the most  
widely used



## Hi-eF SEPARATION SELECTION GUIDES

Here's how to simplify and speed your specification and selection of scrubbers, separators, purifiers and mist extractors. Send for a complimentary copy of these easy-to-use selection tables. With these handy charts, in a matter of seconds you choose units for even the most difficult applications. Our engineering department will be glad to send you these tables to save you time, effort and money. Circle the reader service card now.



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See the  
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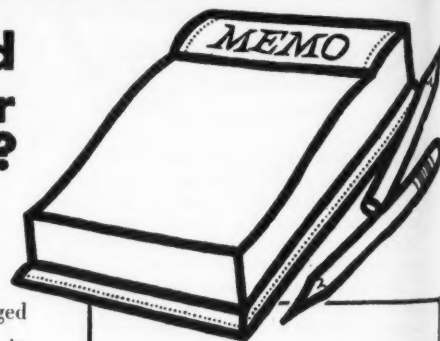
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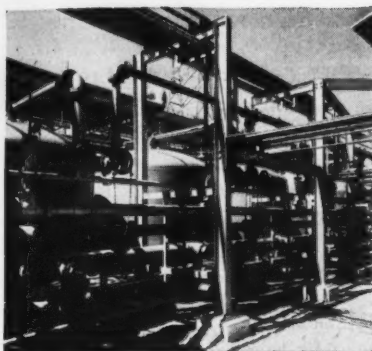
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CHEMICAL PROCESSING

# ILLCO-WAY

ionXchange

## filters



### FOR PRODUCTION OF ClearWater

In the design and manufacture of water-treating equipment, it often becomes necessary to include a filter of some type in the line-up in order to insure clarity and cleanliness of the water going to the next step. The picture above shows a large filter installation (in this case, at an outdoor location), one of many we have planned and produced to meet particular conditions or situations.

#### DIFFERENT TYPES MANY APPLICATIONS

The filters we make may be any of the various types usually associated with the cleaning of water. Possible applications are numerous and may include such functions as removal of iron, rust, and manganese, removal of turbidity and suspended solids, clarification of lime-softened water, removal of free chlorine, organic matter, tastes, and odors, and various other special filtering requirements. *Whatever filters are needed in a water-treatment system, we are prepared to produce them.*



ILLINOIS WATER  
TREATMENT CO.  
840 Cedar St.  
Rockford, Ill.

NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.  
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Ont.

Check 4910 opposite last page

APRIL 1958

#### NEW LITERATURE

##### Air pollution control

Manufacturer's new brochure tells how installations have stopped air pollution — often at an actual savings — in a wide range of industries. Systems are designed to clean up combustible pollutants and odors, and recover waste heat in process exhaust gases. Oxy-Cat Systems Brochure — Oxy-Catalyst, Inc., Wayne 7, Pennsylvania.

Check 4522 opposite last page.

##### Power transmission

Manufacturer's 32-page catalog contains power transmission equipment including variable-speed pulleys, wide V-belts, sheaves, motor bases, counter-shafts, and transmissions. Cat P-57 — Lovejoy Flexible Coupling Co., 4949 W. Lake St., Chicago 44, Ill.

Check 4911 opposite last page.

##### Nozzle catalog

Manufacturer's line of bronze, cast iron, and stainless steel nozzles in capacities from 1/4 pint/min to 4000 gal/min are described in nozzle catalog — Spray Engineering Co., 105 Cambridge St., Burlington, Massachusetts.

Check 4867 opposite last page.

##### Side-dump bucket cat

Folder of four pages describes and illustrates manufacturer's excavating tractor which features side-dump bucket. Specifications are included. Form 717-32783 — Caterpillar Tractor Company, Peoria, Ill.

Check 4912 opposite last page.

##### Industrial chemicals

Pocket-size, 16-page booklet describes 24 basic industrial chemicals—both inorganic and organic. "Industrial Chemicals"—Industrial Chemicals Div., Olin Mathieson Chemical Corp., Baltimore 3, Md.

Check 4913 opposite last page.

# LENAPE

## Elliptical Manhole



SADDLES  
or

RINGS

and  
FITTINGS

### for Every Pressure Vessel Requirement

Lenape elliptical access openings (straight rings or flued and curved saddles) and fittings are produced in sizes ranging from 4" x 6" to 18" x 24".

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- Code quality Carbon Steel
- 304L and 316L Stainless Steel
- Everdur 1010 Silicon Bronze
- T-1 quenched and tempered steel
- also Monel, Nickel and Aluminum

**Low Cost** • assured by Lenape's specialized production methods . . . savings which are passed on to you.

For detailed specifications write today for Bulletin 565 or refer to pages 44-48 in Lenape Catalog 10-53.

See our standard line of pressure vessel connections on pages 1128-1129 in the 1958 Chemical Engineering Catalog.

## LENAPE

PRESSURE

VESSEL

CONNECTIONS

LENAPE HYDRAULIC PRESSING & FORGING CO.  
DEPT. 100 WEST CHESTER, PA.

RED MAN PRODUCTS

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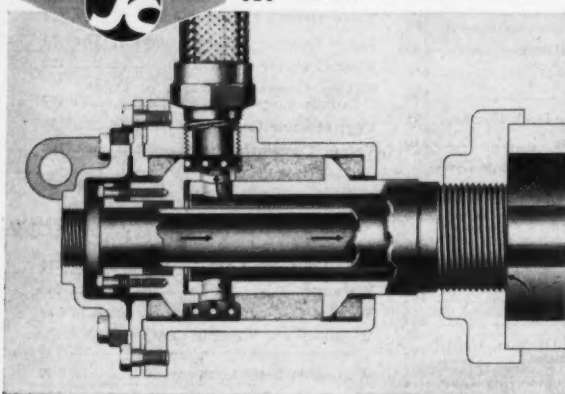
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Check 4916 opposite last page

## THAT'S INTERESTING

### Building with plastic

Plastic is really coming of age as a building material. Basic provisions of a "Model Chapter on Plastics for Inclusion in a Building Code" have been adopted by both the International Conference of Building Officials and the Southern Building Code Congress. At the annual meeting of the ICOBO in San Francisco, members voted to include the plastics recommendations as a chapter in the Uniform Building Code.

### Glittering G-15

Not a "solid gold cadillac" but a gold-plated computer marked the 100th model G-15 instrument that rolled off the Bendix Computer Div. assembly line. In computer production this is comparable to the one-millionth automobile pulled off an assembly line in Detroit. Recipient, Dow Chemical Co., will use it in new fiber development.

### 'Dry' aerosols

Alcohol-free aerosols are now possible using a series of fragrances developed by van Ameringen-Haebler. Fragrances are highly soluble in commonly used propellants and provide a "dry" aerosol for such uses as topical burn remedies, anesthetics, antibiotics, bandage sprays, and inhalants.

### High cost of fire

The country's fire losses hit a new record high in 1957 according to preliminary estimates compiled by the National Fire Protection Association. Fire losses totaled \$1,275,000,000 which includes \$1,050,000,000 loss to buildings and contents; \$225,000,000 loss in aircraft, motor vehicles, forest, and other non-building fires. Fire deaths for last year were short of the record but the 11,300 figure showed an increase of 700 over the 1956 total.



## Leak Lock **STOPS LEAKS** where other compounds fail!

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## THAT'S INTERESTING

### Infrared detector

Detection, control, and other applications involving materials that emit infrared are possible with a transistorized infrared detection device produced by Lindly Co. of Mineola, N.Y. It will give reliable operation in daylight or at night time, and several months of continuous operation can be obtained from self-contained dry cell power source. Pocket-size "Infra-larm" produces an audible signal whenever subjected to infrared radiation of the order of micromicrowatts.

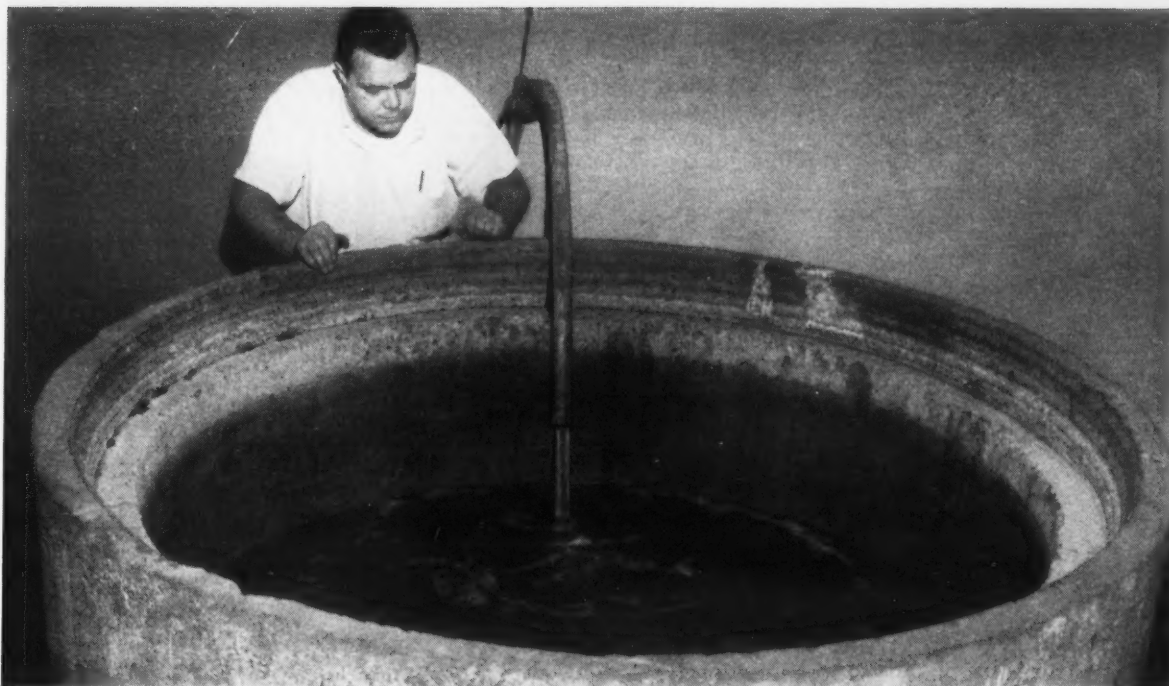
### Root of cortisone supply

Efforts to assure a continuing supply of cortisone are being advanced by plant explorations in remote areas of Mexico and Central America. Tuberous roots of *Dioscorea* yams are most abundant and readily available source of genin and other compounds from which cortisone is synthesized. Spurred by concern that wild supply may eventually become exhausted, experiments are being made to develop strains that will perform satisfactorily under cultivation in the US.

### Empty space?

Although virtually no atmosphere exists in space, hydrogen atoms are present. The estimated frequency is one atom per cubic centimeter about equivalent to a grain of sand in a space of 380-cubic miles. Recently, Dr. R. B. Dillaway of Rocketdyne pointed out that cosmic storms and electromagnetic fields conceivably could increase this density 1000 times and become a factor of consideration at vehicle speeds over 150,000 feet per second. (Skywriter, North American Aviation, Inc.)

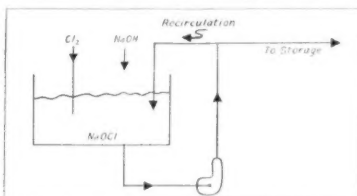
More "That's Interesting" articles are on pages 2, 3, 5, 86, 105, 205, 242.



HYPALON hose, in continuous use since May, 1954, recirculates bleach solution (diagram) and transfers it to storage vat shown above.

## HYPALON® hose cuts bleach plant replacement costs

John Wiley Jones Company of Charlotte, North Carolina, manufactures bleach for laundries, paper mills and textile houses. In the manufacturing process, sodium hydroxide, 26° Baumé is pumped into vats, chlorine is added, and the blending of the two



chemicals produces sodium hypochlorite. HYPALON hose is used to recirculate the solution during production

and to transfer the bleach to storage.

The hose is used intermittently 8 hours a day, 6 days a week, and is immersed in the vats to prevent spray and spilling. Pressure is about 20 psi, and temperature range is 40-100° F. Ordinary rubber hose, used previously, had to be replaced every few months because bits of rubber, shredded from the hose by chemical attack, contaminated the bleach.

John Wiley Jones Co. started using the HYPALON hose in May, 1954. Since then it has been in continuous use without contaminating the bleach. There have been no maintenance or replacement costs since its installation.

In service such as this, HYPALON'S

balanced combination of properties pays off in long service, less maintenance. Although usually referred to as acid hose, HYPALON hose might be better termed "chemical hose." It has proven effective for both alkaline and acid service, particularly where strong oxidizing agents are encountered.

In addition, DuPont HYPALON synthetic rubber is resistant to heat (250-350° F.), ozone, abrasion, flex cracking and weathering. It is used in a wide variety of applications where conditions are severe. Tank linings, gaskets, protective clothing are examples. Mail the coupon below for more information on HYPALON... and neoprene, the synthetic rubber made by DuPont for over 25 years.

HYPALON is a registered trademark of E. I. du Pont de Nemours & Co. (Inc).

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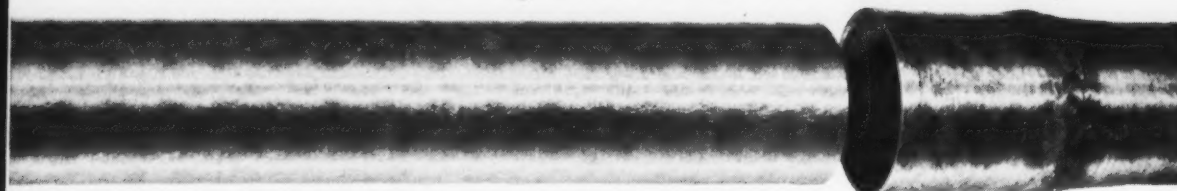
E. I. du Pont de Nemours & Co. (Inc.)  
Elastomer Chemicals Dept. CP-4  
Wilmington 98, Delaware

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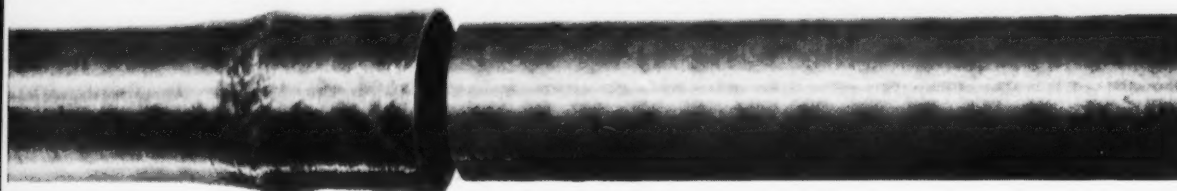


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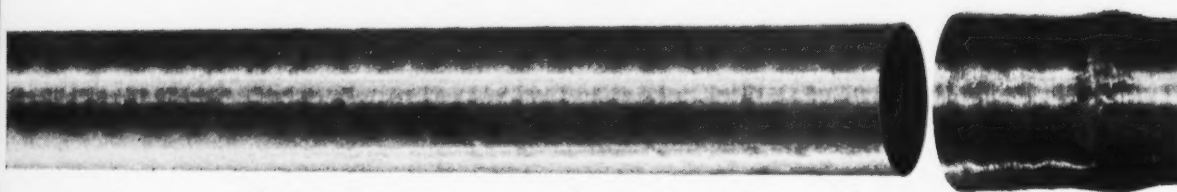
# BONDSTRAND® by Amercoat®...revolutionary



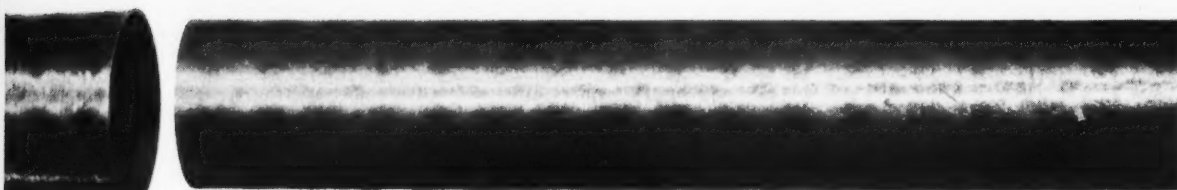
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